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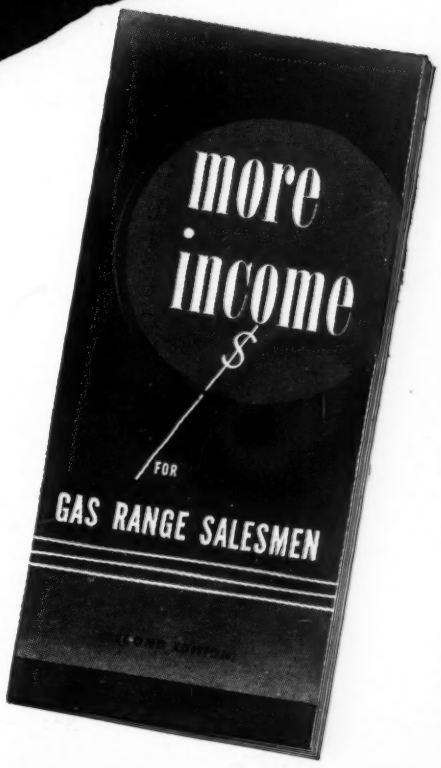

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GAS

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Twenty-Second Year of Publication

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THERMALLY THINKING

By ELLIOTT TAYLOR, Editorial Director

GAMA Gripes

THE utility members of the American Gas Association's national advertising committee are disturbed. They are disturbed because the 1947 advertising program of the gas industry will be $160,000 short of the $872,000 spent under the current year's budget. The $160,000 is money that the gas appliance and equipment manufacturers contributed to the 1946 campaign, and which won't be laid on the line for 1947.

The national committee says that the manufacturers got a good run for their money, which they did. Four pages in national weeklies totalling 15 million circulation were devoted, one page each, to refrigeration, water heating, house heating, and air conditioning. The space cost a good bit more than the manufacturers subscribed.

The national committee says that now is no time for combined industry advertising to let down, but rather that it is the strategic moment when all plans should be laid to step it up in volume and if possible in effectiveness. They are right again.

But has the national committee made any effort to investigate the reasons for the manufacturer recalcitrance toward contributing to the utility administered fund? These reasons may be many and varied, and some of them may be very deep seated and obscure. Manufacturers are never anxious to tell customers what is wrong with their viewpoint. Yet some of these moot points must be brought out into the open and settled if the utilities and the appliance manufacturers are to work together in harmony and develop to their fullest the potentialities of the postwar market for gas.

One point of fundamental difference between a growing number of manufacturers of appliances and the utilities, as represented by the American Gas Association, has to do with the ever increasing elaboration of the requirements incident to obtaining the A.G.A. Testing Laboratories' approval and the right to display the blue star on accredited models.

In eloquent expression of this question and its implications we present the argument of one manufacturer in the form of a letter which we have specific permission to use over his signature. The letter needs no interpretation on our part; but we recommend the viewpoint as worthy of the consideration of the national advertising committee when its members jointly and severally ponder the possible reasons for the appliance makers' disinclination to divy up for the 1947 drive.

"Harold Massey's article in the April issue of GAS (New Ideas May Become Appliance Standards —P. 27) about gas appliance requirements and the approval and listing routine did not mention what appears to me to be the greatest obstacle to the ultimate success of the practice of going beyond minimum standards of safety in the approval system. I refer to the amounts of money it is practical for manufacturers to assign for research, developments, and promotions under the prevailing system.

"Standardization of quality and performance and listing of appliances in forms that readily identify them in comparison with competing appliances is grade labeling, as far as important buyers are concerned. Such a practice effectively limits the amounts of dollars manufacturers can allot to developments and promotions. It greatly stimulates price competition and when strong competitive conditions prevail it practically eliminates developments and promotions among the great majority of appliance manufacturers. It is contrary to the proven way to develop an aggressive appliance industry.

"Under the present system of requirements, approvals and listings, the gas industry is definitely leading toward a stabilized condition wherein the great majority of appliance manufacturers, will not be more than production units to supply normal demands that gravitate to them at prices which do not include costs of developments and promotions. Under such conditions there will be no opportunity for the utility industry to shift the main burden of appliance promotion, needed by the gas industry, over to manufacturers of appliances where it properly should be.

"No doubt these conditions have developed without the full understanding or the intent of utility executives, but the fact remains that the economics of appliance manufacturing make such results inevitable under the conditions the industry has voluntarily sponsored and developed.

"You do not have to be a master of business management to understand why this is so. The gas appliance business for the period of price control is limited in its development and promotional possibilities by the practices of pre-war days. The gas appliance business beyond that time is going to be influenced to a large degree by the large quantity purchases for housing. Sales to individual buyers are going to be less important as a factor in shaping gas appliance manufacture policy. Picture what you would do if you had the responsibility of buying gas appliances in lots of 100 or more for housing where every dollar saved is multiplied many times.

"It is no secret that some few gas appliances and many electric appliances have (and should have) a substantial proportion of their costs expended for development and promotion in order to retain their standing in the established appliance field.

"A skilled buyer has no difficulty in eliminating the higher cost appliances when he has convincing and authoritative evidence that the low bidder on his tabulation is as fully qualified to fill his needs as the higher bidders. The latter, he reasons, are higher because they maintain more costly standards of development and promotion.

"Years ago, before the system of elaborate controls became well established, the gas appliance industry showed signs that it was starting out to achieve national prominence in the matter of promotions. Names like Estate Fresh Air Oven, Reznor,

Magic Chef, Humphrey, and the Bryant Pup are still remembered by the readers of full page ads in the *Post*. While many others could not achieve such top rank, most gas appliance manufacturers maintained sizable development staffs and agressive promotions on a large scale for their volume of sales. In my company as high as 25% of sales volume was spent for promotion and sales expense in pre-depression years.

"While the depression did have quite a bearing on the breakdown of aggressive action in development and promotion, there has never since been any indication that the industry has had a tendency to develop the individuality that must characterize promotions.

"I think one of the main reasons for this lack of enthusiasm for individual products is the habit, which is now thoroughly set, of thinking about new developments in terms of requirements and approvals wherein anything good is quickly forced into standard practice.

"Utility patronage and promotions with their excellent sales organizations have delayed a full accounting of the effects of the approval and listing system as it has developed. But utility patronage is tending to be less and less of a factor in the total volume of appliance production.

"The effects of this unique policy of the gas industry should become more clearly defined when we can observe the effects on the industry caused by the buying choices in gas appliances for postwar housing. We had a forecast of what probably will happen in government buying for wartime housing.

"Government buyers would not even look at pictures, and they regarded the futile attempts of salesmen to justify higher quality or performance as so much dream stuff. They wanted to know just these four things:

1. Is it the type of appliance specified?
2. What is the Btu capacity?
3. Is it A.G.A.-approved?
4. What is the price and delivery?

"Whether we like it or not, that is where the listing of adequate quality gas appliances has led us. I believe, however, that most gas appliance manufacturers have adjusted their affairs to suit the conditions and are more or less reconciled to its continuation. While there has been for many years a large volume of closed room griping about the conditions, manufacturer organizations have never seen fit to take up the issue as a group and to talk it out with top utility management.

"Now we have our good utility friends somewhat disappointed in us because we do not become dynamic and develop new devices and promotions more readily for the much publicized coming "battle of fuels." It will save a lot of irritations and futile efforts in attempts to spur gas appliance manufacturers into impractical actions if the entire industry will realize the limitations which must prevail under the approval and listing policy as it now stands.

"That's the way it will be as long as we have grade labeling to kill the efforts of new developments and new promotions in the minds of important buyers. Certainly the public gets a good deal for the time being. But is it sound practice for the good of the industry and the public over the long pull? The American standard of living has advanced rapidly and soundly under the system of great freedom of expression and action in the development and promotion of the products of individual companies. I favor that system as against the collectiveism we now have in gas appliance affairs.

"E. C. Adams"

Money Wasted

WELL, the Dallas Chamber of Commerce has been having a little fun for itself at the expense of the coal-starved easterners and just for a gag it ran a full page advertisement in the New York papers on May 14. The copy went on to say that, "By the grace of God, geography and lots of natural gas" the southwest is being spared the inconvenience and humiliation of brownouts and blackouts, and that its "personal affairs and economic welfare are not dependent on recurring coal strikes."

The ad also pointed out that Dallas has a good supply of hardworking and efficient labor—especially handy at turning out B-24 gun turrets, it seems—and that the climate is ideally adapted to summer air conditioning.

The implication is that Dallas invites the East to move southwest if it wants to be shed of the endless embroilments between the mine owners and their happy, carefree coal diggers.

Dallas is just wasting its dough. The East loves coal strikes. Every year it demonstrates that no inconvenience to its citizenry and no disruption of its economic processes is too great a price to pay for the privilege of watching the annual goon war between recalcitrant management and its sullen servants.

The East knows that while the owners and the unioneers fight it out in a magnificant display of uninhibited oratory, nobody will ever be hurt but the innocent bystander, and he can take it.

Operators and miners may have their little differences over wages and hours and the like but when something big comes up they are fast to form a united front in adamant opposition to public convenience.

Dallas could have observed that, strike or no strike, the National Coal Association, the Anthracite Institute and the United Mine Workers were all in there pitching on one big issue: They had all entered protests against the disposal of the war emergency pipe lines to gas transmission companies who have submitted bids to buy them, and filed as intervenors against the granting of certificates of public convenience and necessity, by the Federal Power Commission, to operate them.

At least, we suppose the East loves coal strikes. For while it listened in impotent respect to the charges and counter charges in the coal war, not one voice was raised to suggest that the interminable public brawling over the conditions governing production of an inferior fuel wasn't worth it, and how about using the idle pipe lines to bring in the wasted Texas gas and settle at least a part of the problem.

But nobody said a word, including the manufactured gas utilities that howled about their coal stock piles getting low; and a person would think they might have grabbed the opportunity to put in a word for natural gas, and how they would be proud to serve it.

So everything was quiet on the eastern front and it was a good show; and the next time, Dallas, our advice to you is save your money because the dam Yankees are used to things the way they are and they just don't like change any more.

Highlights

• "It has long been the ambition of the manufactured gas industry to produce city gas directly from coal and oxygen . . . The direct gasification process (the Hydrocol) would eliminate the uses of expensive gas oil and could be continuous . . . Preliminary data . . . indicate that in such localities as New York, city gas can be made from bituminous coal less than the cost of natural gas purchased at the wells in Texas for five cents per thousand cu. ft. and transported to the east coast by pipe line."

J. F. Keith, president, Hydrocarbon Research, Inc.
(See page 21.)

• "The natural gas industry . . . now serves 41 million people in 33 states with a network of 218,000 miles of trunk pipe lines and mains with a total production of three and one-half trillion feet and a market value of $750 million. It has advanced from 38 to 48% in the numbers of customers served by the whole gas industry. A recent statistical analysis of 116 natural gas companies shows total assets of over $3 billion. It is the life blood of the whole gas industry . . ."

R. H. Hargrove, chairman, Natural Gas Dept., A.G.A.

• P. A. Frye, Louisiana's natural gas czar, has run up against opposition before his own state's Revenue Code Commission in his effort to boost the state's natural gas tax from ½ cent to 3 cents per Mcf. Spokesmen for manufacturers and industrial interests joined the natural gas industry in opposing the scheme, declaring it would seriously hamper the industrial expansion.

• The Federal Power Commission has done a fast about face as a result of the coal strike, in authorizing Northern Natural Gas Co. to deliver gas during the emergency for use as boiler fuel in the Boone, Iowa, electric generating plant. The application to fire this plant with gas, first denied and now under reconsideration by the commission, has become an industry *cause celebre* as the first instance in which the commission exercised an end use authority admittedly to prevent the replacement of coal with gas.

• As a result of increasingly outspoken differences in viewpoint between manufacturers of gas appliances and the A.G.A. laboratories on what constitutes legitimate limits to which appliance requirements may go, A.G.A. President Boothby has appointed a six-man committee to review the entire Blue Seal requirements situation. Three members will be utility representatives and three appliance and equipment manufacturers.

• To facilitate the filing for ready reference of monthly bulletins of utility gas sales, the publicity bureau of the A.G.A. has recently completed the mailing of 600 loose-leaf binders to important banks, insurance companies, investment counselors and others who might normally be expected to have use for a complete and cumulative file of industry sales statistics. Present plans are to supplement the monthly bulletin with a mid-month news letter containing further information of interest to the utility investment field.

• The alacrity with which Interior Secretary Krug complied with President Truman's request that the Interior Department set up an oil and gas division revives speculation as to whether it may not be the intention of the President to make the Federal Power Commission responsible to the Secretary of the Interior in all matters pertaining to the administration of the Natural Gas Act.

• "We hear talk from the tax eaters that natural gas taxes should be increased but any tax placed on gas today with its present low price becomes confiscatory. Adequate prices will bring increased taxes automatically, since the tax is based on price received at the well."

Fred Shield, president, Texas Mid-Continent Oil and Gas Association.

• "Withdrawals of natural gas must be on an orderly, well coordinated and economic basis, with due regard to the public, both producing and consuming. Exploitation for purely private gain must be discouraged."

E. J. Boothby, president, A.G.A.

• "The gas industry did the biggest job in its history during the war period . . . It was carried out under difficult conditions and completed in such manner as to justify earning the plaudits and esteem of its customers and the public generally. As a result, gas fuel, particularly natural gas, is more sought after and stands higher in public opinion than ever before in history."

B. R. Bay, ex-president, Mid-West Gas Association.

• " . . . For the first time since the passage of the Natural Gas Act in 1938, the industry as a whole is attempting to present the major problems affecting it. Prior to the start of the investigation [FPC Docket G-580], each natural gas company individually presented its expansion and rate problems to the FPC. The investigation . . . will result in further unification of the industry for the betterment of service to the present 10 million consumers of natural gas as well as future consumers."

E. Buddrus, president, Independent Natural Gas Association of America.

• Slated for conversion from manufactured or mixed gas to straight natural during the next few months are cities and environs of St. Louis, Mo. St. Paul, Minn. and Washington, D. C. According to present estimates, nearly 600,000 new natural gas customers will be added when the change-over in these centers has been completed.

Although resumption of production on SKINNER-SEAL Bell Joint Clamps — the universal repair for bell and spigot joint leaks — has hit many snags, we feel that progress is now being made.

Please write us as far in advance as possible so that we can do our utmost to meet your needs.

Our Catalog No. 41 — virtually a manual on pipe repair and service methods — gives valuable information on other SKINNER-SEAL pipe repair clamps in which you may be interested. If your copy has been mislaid write us today.

M. B. SKINNER CO., SOUTH BEND 21, INDIANA

SKINNER-SEAL BELL JOINT CLAMP

GASOLINE FROM NATURAL GAS

By P. C. KEITH

President, Hydrocarbon Research, Inc., New York City.

CONSIDERABLE interest has been exhibited of late in the possibility of developing a process for making gasoline from natural gas at a cost competitive with the cost of gasoline from crude oil. Such a process would make natural gas this country's first important source of motor fuel independent of petroleum. The need for a substitute oil source grows steadily as withdrawals from our crude oil reserves continue to exceed the rate of discovery of new deposits. The situation was of course aggravated by World War II, but it promises to remain a point of real concern in the post-war period. Just how long it will be before we face a real serious crude oil shortage is a matter of conjecture, but this much is certain: our oil reserves are dwindling.

The proven reserves of natural gas, on the other hand, have increased materially in recent years, and the indications are that this trend will continue. In fact, the present production rate is only half the rate of discovery. If the production rate were doubled, thereby approximating the rate of discovery, and if this incremental production were converted to gasoline and oil, motor fuel production would be stepped up by 25%. Given a satisfactory natural gas to gasoline process, then, it is evident that natural gas could become an important factor in the country's oil economy.

Furthermore, the manufacture of gasoline from coal is only one step removed from the manufacture of gasoline from natural gas. With our huge coal reserves, an economic coal to gasoline process would have the effect of underwriting this country's gasoline and oil requirements for centuries to come.

Hydrocarbon Research, Inc. has developed an economic natural gas to gasoline process. Known as the Hydrocol process, it consists of the conversion of natural gas to a mixture of carbon monoxide and hydrogen, followed by catalytic reaction to produce liquid hydrocarbons boiling substantially within the range of gasoline. Byproducts are high-grade diesel oil and oxygenated compounds such as alcohols.

The Hydrocol Plant

The first commercial application of the Hydrocol process is to be made by Carthage Hydrocol, Inc., in a plant soon to be erected at Brownsville, Texas. This plant, to be engineered by Hydrocarbon Research, Inc., has been designed to process approximately 64 Mcf of natural gas per operating day and to produce the following:

Motor fuel	5800 bbls. per day
Synthetic diesel oil	1200 bbls. per day
Crude alcohols (in water solution)	150,000 lbs. per day

The finished gasoline produced by Hydrocol with a Reid vapor pressure of 10 lbs. has a clear octane number of 80 CFRM or 88-90 CFRR. This quality of gasoline compares favorably with that produced by catalytic cracking of distillate fractions from petroleum. The diesel oil has a gravity of about 38° A.P.I., a cetane number of 45-50, and a pour point below 0° F. The oxygenated compounds in water solution consist mainly of acetaldehyde, acetone, and ethyl, propyl, butyl, amyl and heavier alcohols. This last product offers an extremely attractive source of chemical raw materials.

The Hydrocol process calls for the following operations:

1) The recovery of approximately 0.25 gals of natural gasoline and butane per Mcf of feed gas. (Recovery of this natural product becomes economical only as an incremental operation of the Hydrocol process.)
2) The separation of 40 Mcf per day of high purity oxygen from air.
3) The partial combustion of 64 Mcf per day of natural gas with the high purity oxygen to produce a mixture of carbon monoxide and hydrogen.
4) The conversion of this mixture of carbon monoxide and hydrogen—called Hydrocol gas—into gasoline and other synthetic products.
5) The separation of the gasoline and other synthetic products by fractionation and absorption techniques.
6) Treatment of the gasoline to remove oxygenated compounds, polymerization of the propylene and butylene, rerunning, blending, etc.
7) The manufacture and revivification of catalysts.

The Carthage Hydrocol plant is scheduled to be in operation late in 1947 and will cost an estimated $15 million. Allowing credit for the diesel oil at 3½ cents per gal. and for the crude alcohols at ½ cent per lb., it is predicted that the "out-of-pocket" cost of the gasoline will run about 2½ cents per gal. This cost includes all expenses and charges exclusive of capital costs. When capital costs, including interest, depreciation and amortization, are added, the cost of the gasoline becomes 5.25 cents per gal. This figure compares favorably with figures for producing gasoline of similar quality from crude oil at today's crude prices. Discounting any advantages which would result from a probable increase in the price of crude, it is obvious that the most promising avenue for improvement in the economics of the process is in the reduction of capital cost. Substantial reductions in the cost of future Hydrocol plants seem probable.

History of the Process

With this picture of the projected plant in mind, it is interesting to review the history of the process. Twenty-five years ago, two Germans, Franz Fischer and Hans Tropsch, discovered a process for the synthesis of gasoline and oil from "water-gas"—i.e., a mixture of carbon monoxide and hydrogen prepared by blasting incandescent coke with steam. This so-called Fischer-Tropsch method was developed to the point of commercialization under government subsidy in that country about ten years ago. While it would have been uneconomic in the United States, it received favor in middle Europe due to the almost complete lack of petroleum and to the resulting artificial economy. American engineers first became seriously interested in synthetic gasoline shortly before the recent war. A survey of the German work led to the conclusion that the Fischer-Tropsch installations, while highly developed from a chemical standpoint, were basically lacking in engineering design. It appeared that the application of modern chemical engineering practice, as typified by the process installations of the petroleum industry in this country, might very well make it possible to build

GASOLINE FROM

FAR - REACHING effects in the economy of the gas and oil industries as a result of future exploitation of the process of making gasoline from natural gas is predicted in this article by Mr. Keith. A general overhauling of the price relationships between gas and crude oil is one of these effects, and a new emphasis on gas conservation is another. Of further importance to the nation at large is the thesis that, since the rate of production of natural gas at the present time is only about half that of discovery of proven reserves, and since the discoveries are on the upgrade, if production were to be doubled to approximate the rate of discovery and this added increment to be used in the making of gasoline motor fuel production might be stepped up 25%.

The author explains what has been done in the field of research to develop the economic gas-to-gasoline process, which converts natural gas to a mixture of hydrogen and carbon monoxide, followed by a catalytic reaction to produce liquid hydrocarbons boiling substantially within the range of gasoline.

Application of the Hydrocol process in a plant being built by Carthage Hydrocol, Inc., in Brownsville, Texas, is discussed.

P. C. Keith

A native Texan, Mr. Keith was educated at Massachusetts Institute of Technology, where he did special graduate work for three years. Later he was vice-president of the M. W. Kellogg Co. in charge of engineering, processing, and research; shortly before Pearl Harbor he was active in designing plants for the production of butadiene, aviation gasoline, toluene, and other vital products.

Within three weeks of this country's entrance into World War II, Mr. Keith was appointed to the newly created Planning Board of the S-1 Section of the Office of Scientific Research and Development. The S-1 Section was the forerunner of the Manhattan District atomic bomb project.

For the next three years and eight months, Mr. Keith was to devote the greater part of his energies to the development of atomic power. During the early months of 1942, he directed the engineering, research and development of the diffusion process under the sponsorship of the O.S.R.D. Later, as vice president and technical director of the Kellex Corp., he was responsible for all research and development, process design, engineering, procurement of materials, and supervision of plant construction for the Oak Ridge gas diffusion project.

Now, as president of Hydrocarbon Research, Inc., Mr. Keith is busy putting the final touches on a process for the conversion of natural gas to 88 octane gasoline and completing arrangements for the construction during the coming year of a full scale plant to carry out this process.

a plant which would hold its own in an open market.

In reviewing the history of synthetic gasoline, it is convenient to treat separately (1) the manufacture of the carbon monoxide and hydrogen mixture, and (2) the reaction of this mixture, to produce gasoline and other hydrocarbons.

The manufacture of carbon monoxide and hydrogen mixtures by the "water-gas" reaction is an old and familiar process. It will be recognized immediately as the basis for the production of "city gas." The first commercial Fischer-Tropsch plant in Germany, built by Ruhrchemie A.G., made use of this reaction to produce the necessary ingredients for synthetic gasoline. Prior to this application, however, I. G. Farbenindustrie A.G. had had occasion to produce mixtures of carbon monoxide and hydrogen, at first for the manufacture of ammonia and later for the manufacture of methanol and synthetic oil. Since I.G. did not have access to sufficient reserves of coking coal, they were forced to adapt the process to "Braunkohle," a superior species of peat slightly lower in rank than bituminous coal. Consequently, they developed a method for producing suitable carbon monoxide-hydrogen mixtures by burning Braunkohle with steam and oxygen. The I. G. process, as finally developed in the middle and late thirties, became a reality when a mechanically sound generator was designed and an economic method of producing oxygen was developed.

The generator, known to the trade as the "Winkler" generator, looks very much like a squat blast furnace. Into an opening in one side there is fed crushed Braunkohle. Through tuyeres around the periphery near the bottom a preheated mixture of oxygen and steam is introduced at high velocity. This gas mixture passes up through a grate, suspending the Braunkohle in the form of a "boiling bed" above the grate. It is interesting to note that this principle of suspending a powdered solid in a high velocity gas stream is also the basis of the fluid catalyst bed, a technique which is finding greater and greater application in petroleum refining and in the chemical industry as a whole. By burning the Braunkohle in the presence of oxygen and steam, temperatures up to 2500° F are attained in the generator, with the result that the contained hydrocarbons are distilled and cracked, and essentially all the whole mass, except the moisture and ash, is converted to a mixture of carbon monoxide and hydrogen.

The oxygen, 98% pure, was produced by the Linde-Frankl process. This method involves compressing and liquefying air and then separating the oxygen from the nitrogen by fractionation. In the Linde-Frankl process, moisture or carbon dioxide is eliminated from the air mechanically rather than by chemical treatment. Much of the economy derives from the fact that upwards of 96% of the feed air needs only to be compressed to about 75 psi gauge. The plant is continuous and extremely simple in operation. In 1938, I.G. were producing millions of cubic feet per day of oxygen by this method.

With natural gas as the starting material in place of coal or Braunkohle, the natural gas can be converted either by direct burning in oxygen or by reaction with steam in an indirectly fired retort. The latter method is the familiar steam-methane process used in the synthetic ammonia and synthetic methanol processes. The steam-methane process requires a prohibitively high capital cost as well as an excessive consumption of methane. It was, in fact, the realization that cheap oxygen and direct burning of the natural gas afforded the only economic method of producing the carbon monoxide and hydrogen mixture required for synthesis that led Hydrocarbon Research to spend so much effort and money perfecting the oxygen plant and the direct combustion method.

In the Hydrocol plant to be erected at Brownsville, preheated natural gas and oxygen will be reacted at 250 lbs. pressure in the generator to produce the carbon monoxide and hydrogen mixture known as Hydrocol gas. Experimentation at Olean, N. Y., in a 10 bbl. per day semi-commercial plant, and on a larger scale at Montebello, Calif., has shown that the reaction goes smoothly and controllably. Operating at this pressure is advantageous because it eliminates the necessity for inserting a compressor station between the generator and the synthesis reactor. Since the natural gas will be available under pressure, the only requirement is to compress the oxygen prior to mixing it with the natural gas in the generator. Although the reaction takes place at relatively high temperature, the metal shell temperature can be maintained safely within accepted working limits by the proper selection of insulating materials and the introduction of vapor stops.

It is of interest that the oxygen unit of the Brownsville plant will be the largest ever built. Compressing air to 75 lbs., it will produce 40 Mcf per day of oxygen at an estimated cost of 4.8 cents per Mcf. This figure is based on an investment of $3.5 million for the plant (including construction labor,

materials, etc.) amortization at 12½% per year, maintenance at 4% per annum, and two operators per shift. Power (amounting to less than 14 kw per Mcf of oxygen) and water costs are excluded, since they are both available as by-products of the process and are automatically covered in the price paid for natural gas.

As will be developed later, this oxygen development should be of real interest to the gas industry since it promises not only to lessen materially the cost of making "city gas" but to open up the possibility of completely gasifying coal and producing therefrom a 1000 Btu pipe line gas.

Synthesis Reaction

The catalytic reduction of carbon monoxide with hydrogen to produce hydrocarbons has been known since 1902 when Sabatier, the great French experimentalist, synthesized methane over cobalt and nickel catalysts at 400°-600° F. In 1912 the B.A.S.F. (Badische Anilin und Soda Fabrik, later I.G.) in Germany discovered that hydrocarbons higher than methane were formed in small amounts when carbon monoxide and hydrogen were reacted over an alkali-promoted iron catalyst at temperatures of 775°-850° F. and pressure of 100-150 atmospheres. However, the desired product of the reaction was Synthol, a mixture of alcohols, aldehydes, fatty acids, esters, and other oxygenated organic compounds. This led eventually to I.G.'s synthetic methanol process, but as late as 1921, they were reporting the elimination of "objectionable" oil as one of their chief problems.

In 1923, Franz Fischer and Hans Tropsch discovered that the hydrocarbon yield could be greatly increased at the expense of Synthol by decreasing the pressure. In fact, at pressures less than 7 atmospheres, the product was mainly aliphatic hydrocarbons. This work formed the foundation for the Fischer-Tropsch process, which was responsible for the production of a large quantity of synthetic fuels in Germany during the recent war years.

Working under the auspices of the Ruhrchemie A.G., Fischer and his associates examined hundreds of catalysts and finally concluded that cobalt, nickel, iron and ruthenium constituted the most active metals and that thoria and the oxides of other rare earths were good promoters. It was further shown that the presence of some alkali was desirable and that kieselguhr was the best support or carrier of the active ingredients.

By 1933 the process was considered to be well enough developed to build a commercial unit. Accordingly, Ruhrchemie constructed a plant at Oberhausen-Holten with a rated capacity of 1000 metric tons per year (about 8000 42-gal. bbls.) of motor fuel and lubricating oil. The first catalyst used was a nickel-manganese-aluminum oxide mixture on kieselguhr; this was later supplanted by a cobalt-thoria-kieselguhr preparation. This plant, as the others which followed it, had many shortcomings which could be tolerated only under a structure supported by government subsidy. Among these were:

1) The initial cost of the catalyst was high and reworking was expensive.
2) The catalyst was extremely sensitive and had to be broken in very slowly according to a rigorous schedule.
3) The catalyst was rapidly poisoned by small traces of sulfur.
4) Catalyst life was limited to 6-8 weeks, due in part to accumulation of high melting point waxes on the surface.
5) Conversion of carbon monoxide to useful products was only about 40% of the theoretical, despite the use of low space velocities (maximum of 100 volumes of carbon monoxide per hour per volume of catalyst).
6) The yield of oil per unit of catalyst per unit of time was low, due to the low space velocity, which in turn was limited by the capacity for removal of the heat of reaction.
7) The reactors were complicated, extended surface exchangers, with cooling surfaces no farther than 12-15 mm. from any part of the catalyst. Since the process was operated at atmospheric pressure, the reactors were necessarily large.
8) Recovery of heat of reaction as useful power was low.
9) The gasoline produced had an octane number of about 40, too low to permit its use as a motor fuel without additional treatment.

From a detailed study of German designs and operating data, it became clear that the only way to lower the costs of the process was to improve its efficiency. This involved finding both a cheaper and more efficient means of heat transfer and a catalyst that would operate at a higher space velocity, the catalyst and the reactor design being interdependent.

For example, if the catalyst temperature must be controlled within 25° F. to maintain activity and product distribution, a minimum quantity of cooling surface must be provided on the basis of a reasonable transfer rate. This in turn fixes the maximum space velocity allowable, assuming that the catalyst activity is not limiting. For example, the heat liberation for 90% reaction of one cu. ft. of synthesis gas is about 55 Btu; at a space velocity of 100 the hourly duty would be 5500 Btu per cu. ft. of catalyst space. With a transfer rate of 10 Btu per sq. ft. per hr. per °F. and a mean temperature difference of 10° F., the cooling surface required would be 55 sq. ft. These conditions approximate the best design of Ruhrchemie.

It is immediately obvious, then, why space velocity in such a reactor as the Ruhrchemie design is definitely limited. Raising it will increase the heat load, and hence the temperature, so that either product distribution will suffer (i.e., fixed gas production will increase) or the catalyst will become fouled with coke. Also, under ideal conditions in such a system, localized hot-spots can still occur. In fact, there is experimental evidence that the true catalyst temperature in a fixed bed system is at least 75°-100° F. higher than the observed gas temperature and that at isolated points it is much higher.

There can be no question that catalyst activity has seldom been the limiting factor. More often it has been the efficiency of removal of the heat of reaction. In other words, with adequate heat removal, the space-time yield of oil is potentially much greater than anything that has ever been realized. It was on the basis of this conclusion that engineers of Hydrocarbon Research suggested a program of experimental work in which the space-time yield of oil would be studied as a function of space velocity and cooling surface.

In reviewing the work done by Ruhrchemie and I.G., it became apparent that one possible way of improving markedly the space-time yield of oil was to use the fluid or powdered catalyst technique. With the fluid process, it will be recalled, the catalyst is ground to a very fine powder (approximately 75-80% finer than 325 mesh) and is then maintained in a state of turbulence by aeration with regulated quantities of gas. When the powder is properly prepared, it can be aerated or partially suspended by the gas and assumes many of the properties of a boiling liquid. For example, there is a constant motion of the particles, and while the surface of the bed of powder is reasonably fixed, local eruptions of bubbles are evident. Furthermore, the powder flows freely, exerts a static head, and is compressible. Among the advantages of the fluid catalyst technique are: (1) temperatures can be controlled within 5-10°F; (2) the catalyst itself is utilized as a medium of heat transfer, and (3) processes using this fluid catalyst are continuous, since any decline in activity can be compensated by withdrawal of a portion of the catalyst and replacement with fresh material.

Before embarking on a program of experimental work to determine the feasibility of the fluid catalyst technique for the synthesis reaction, it was concluded that the use of a cobalt catalyst was impractical because of the high cost, the limited amount of cobalt available, and the low-octane number of the gasoline. Accordingly, attention was directed to cheap, rugged, iron catalysts.

Experimental Work

The Hydrocol plant to be erected at Brownsville has back of it over a million dollars of experimentation carried on at Hydrocarbon's experimental station at Olean. The ten-bbl. per day semi-commercial plant built and operated at the experimental station contains all the elements of a commercial plant:

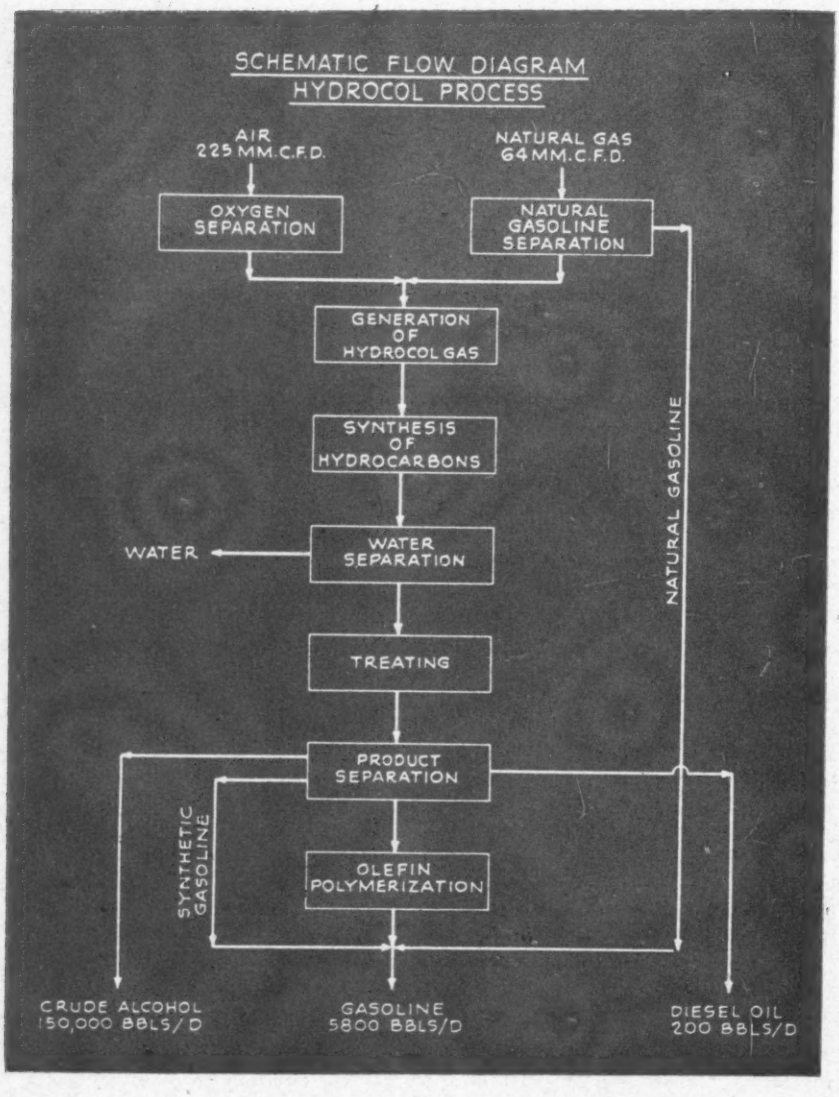
1) A continuously operating low pressure oxygen plant with a capacity of approximately 10 Mcf of oxygen per hour.
2) Pressure generators for the burning of natural gas with oxygen to produce Hydrocol gas.
3) The synthesis reaction system.
4) A product recovery system.
5) Facilities for de-oxygenating the gasoline produced.

Hydrocarbon Research, Inc. started its development work convinced that the Fischer-Tropsch process was fundamentally sound but was woefully lacking in good engineering design. It seemed obvious that the application of modern chemical engineering practice, as typified by the process installations of the petroleum industry in this country, would result in marked improvements in efficiency. In fact, it appeared probable that such engineering improvements would make the process economic in the United States, using natural gas as the immediate raw material.

The principal conclusions from the research and development work were:

1) The oxygen plant design is sound and oxygen can be produced by the Hydrocarbon cycle efficiently and at relatively low cost.
2) Natural gas can be burned directly with oxygen to produce Hydrocol gas. The operation is controllable and the product gas is free of soot.
3) The fluid catalyst technique more than confirmed expectations with regard to heat control, and is certainly the most economic method of operating the process.
4) The exothermic heat of the reaction is almost totally recoverable in the form of high pressure steam. The Carthage plant will produce upwards of 750,000 pounds per hour of high pressure by-product steam.
5) Conversions of Hydrocol gas of better than 90% are obtainable with a cheap, rugged catalyst.
6) The yield of oil, based on carbon monoxide reacted, is higher than that obtained by any German investigation, and the treated gasoline is of a premium quality.
7) The allowable space velocities, and hence the space-time yields, are order of magnitude greater than any achieved in Germany.
8) The yield of gasoline can be readily controlled to constitute better than 80% of the total useful products.
9) There are no real difficulties or novel methods required in separating the products or in deoxygenating the gasoline.

The initial million dollar research and development program carried on by Hydrocarbon Research was financed by three companies: the LaGloria Corp., the J. S. Abercrombie Co., and the Socony Vacuum Co. Later material development and engineering contributions were made by the Standard Oil Co. of New Jersey and by the Texas Co. The country as a whole should recognize the role these companies have played in furthering the development of cheap synthetic gasoline in the United States.



Significance of the Process

The successful operation of the plant at Brownsville could have far-reaching effects upon our national economy. These effects are most likely to be felt first in the oil industry. The feasibility of producing large quantities of a superior motor fuel from a portion of our "known" dry gas reserves will have been demonstrated. Since these reserves amount to about 175 trillion cu. ft., potentially they represent about as much oil as do our crude oil reserves. In other words, when the Brownsville plant has operated successfully and economically over a period of time, it would then be proper to reckon our oil reserves at, say, 40 billion bbls., rather than at 20-odd billion bbls. Then natural gas will begin to compete with crude oil as a raw material from which to produce refined products. What effect this competition will have upon advancing crude oil prices is anybody's guess. Mine is that it will put a ceiling of less than $2 per barrel on crude oil.

An obvious corollary to the above has to do with gas conservation. Sometimes it is difficult to legislate conservation, but when conservation is clearly and immediately profitable, no legislation is needed. Despite the conservation measures now enforced by various state-regulatory bodies, gas wastage still amounts to about 600 billion cu. ft. per year. The major source of this loss occurs in gas vented from oil-gas separators at the fields and from natural gasoline plants. The successful operation of the Brownsville plant will place a portion of this gas in the category of a substitute for crude oil. If it were all used for such a purpose, some 60 million bbls. per year of oil would result. The problem of collecting the gas in large quantities will prevent the use of the entire amount, but some of it will be used, and to the extent it is used, true and real conservation will have been practiced.

Further, the Brownsville plant will indicate a method whereby gas now used as refinery fuel can be converted into gasoline. Again, if all such gas were used for gasoline synthesis, the amount produced would approximate 7½% of our 1945 production. Obviously, all will never be so used, but some refineries will use it, substituting heavy bunkering oil for gas as refinery fuel. And this will lead to an advance in oil prices.

So much for the immediately foreseeable effects upon the oil industry. But how does this development directly and indirectly affect the gas industry? The effects could be fundamental and far-reaching. Firstly, the competition of natural gas with crude as a source of gasoline is certain to increase the price of gas at the well head. In the next several years, improvements in the Hydrocol process will make possible the production of a barrel of oil from 8 Mcf of gas, including all gas used for fuel. If at that time the capital and operating cost of a Hydrocol plant is on a par with an oil refinery (and there is no basic reason why this cannot become true), then 8 Mcf of gas at the refinery will be the equivalent of a barrel of 38° A.P.I. gravity Mid-Continent crude. Then, under these conditions, gas at 17 cents per thousand just balances crude oil at $1.35 per bbl.; both prices as delivered to the refinery.

It is my guess the gas in such localities as Hugoton, East Texas and the Gulf Coast will never quite reach the equivalent price of crude oil. In the first place, gas transportation is inherently more expensive than the transportation of crude oil. Secondly, gas must always be transported by gas pipe lines and not by tankers or tank cars. Therefore its mobility is limited. Thirdly, the effect which the actuality of cheap oxygen will have upon manufactured gas costs will tend to limit the competitive value of natural gas for pipe lines. Nevertheless, gas prices will go up. It is not unlikely that, in the localities I have just mentioned, gas at the well head will be worth 10-12 cents within the next decade.

Effect of Price Increase

This increase in gas price will affect various pipe line companies differently. Those producing more gas than they buy will benefit. Those buying more than they produce may suffer temporarily. I use the word "temporarily" because once natural gas is competitive with crude oil as a source of gasoline, a price floor is established for gas to pipe lines. I should think that any rate-making body would logically base its calculations upon this competitive and possibly posted price of natural gas, rather than upon the present assumption that a gas well is an integral part of a pipe line system. If gas rates are raised in step with the competitive price set by the price of crude, then with an increasing gas price, the pipe line companies, at worst, will suffer only until the corresponding rate adjustments are made. In any event, it would seem wise for the pipe line companies to endeavor to secure adequate gas holdings and reserves.

I have said that cheap oxygen will tend to limit the price of natural gas in such localities as Kansas and Texas. You will recall that the Germans completely gasified "Braunkohle" continuously, successfully and economically. It appears that improvements, comparable in magnitude to those made in the Fischer-Tropsch process, can be made in the gasification of coal.

It has long been the ambition of the manufactured gas industry to produce city gas directly from coal and oxygen. Compared with the present intermittent methods, the direct gasification process would be more thermally efficient, would eliminate the use of expensive gas oil and could be continuous. Hydrocarbon Research, Inc. has such a process in an advanced stage of development. A small pilot plant has been built and successfully operated in which both coking and non-coking coals are distilled and partially gasified with oxygen. The gas as run from the pilot plant has had calorific values higher than required for city gas. Freed of carbon dioxide, the heating value of the gas has varied from 580 to 900 Btu per cu. ft. according to the extent of gasification of the coal.

Based upon these preliminary data and again applying advanced oil refinery techniques to the process design, "guesstimates" have been made which indicate that in such localities as New York, city gas can be made from bituminous coal at a cost less than the cost of natural gas purchased at the wells in Texas for 5 cents per Mcf and transported to the east coast by pipe line. Also, the estimated cost of gas by the direct gasification process is much lower than the present cost of gas manufactured by the larger utility companies.

These studies posed the further question, "Why haul coal to New York and then gasify it?" "Why not gasify it at the mine mouth?" Hence, a careful, thorough, and intensive survey was made of all German processes. These were evaluated in the light of the data gathered from Hydrocarbon's own experimental work. Then a hypothetical plant was designed. From this preliminary work, it appears certain that eventually a process will be developed whereby either coking or non-coking bituminous or anthracite coal can be completely gasified, yielding a pipe line gas of approximately 1000 Btu heating value. These preliminary studies further indicate that the net thermal efficiency—i.e., the ratio of the heating value of the product to the heating value of the coal, including all coal used as fuel—will be about 80%. In other words, it is to be expected that one ton of 13,000 Btu per lb. coal will yield 20 Mcf of synthetic natural gas.

Plant Being Built

Hydrocarbon Research is presently building a semi-commercial plant to produce directly, continuously and with oxygen both "city gas" and "pipe line" gas. It is hoped the plant will be in operation this year and that quantitative design data will be available next year. Our expectations for the process are based in part upon the data gathered during the course of development of the Hydrocol process, and if they are realized, one can visualize gas pipe line companies serving the north and the northeast manufacturing "synthetic" natural gas from coal mined in West Virginia, Illinois and Pennsylvania. Obviously, this development of the direct gasification process will tend to place a ceiling on the price of natural gas.

We have now seen how the Hydrocol process is likely to affect both the price of crude oil and the price of

natural gas, placing a ceiling over the former and raising the latter. We have also seen how the development of a direct gasification process will tend to place a ceiling over the price of both natural gas and manufactured gas. A further factor to be reckoned with in our future economy is the approaching coal to gasoline process. An economic process for transforming coal into gasoline will put a ceiling over the price of crude oil even more effectively than the Hydrocol process. Also, it may well increase the value of some of our low grade coal deposits. However, the amount of coal required to satisfy our entire gasoline market will always be small in comparison to the coal used for other purposes, and so the effect on the country's coal economy as a whole can never be great.

I said "approaching coal to gasoline process," for we are now well on our way to gasifying coal cheaply, and the combination of the direct gasification process and the Hydrocol process IS the coal to gasoline process. In fact, on the basis of figures now available, 6-cent gasoline from $2 per ton coal is not more than two or three years off.

In summary, the successful development of the processes just reviewed will 1) assure this country of an adequate supply of cheap gasoline, city gas and petroleum products for centuries to come; 2) make available cheap oxygen for use in the chemical and metallurgical industries as well as in the gasoline and gas industries, and 3) provide cheap raw materials, particularly carbon monoxide, hydrogen and oxygenated hydrocarbons, to serve as the basis of a great new synthetic chemicals industry.

GAS APPLIANCE MANUFACTURERS FACE THE FUTURE

By LYLE C. HARVEY,

President, Gas Appliance Manufacturers Association

A YEAR ago we were all thinking of the first year after the war as a year of conversion. What we meant was the conversion of industry and business from production for war purposes to production for peace. Every manufacturer looked forward with a feeling that he could speedily accomplish the change. Actually, the period of conversion has turned into a much broader period of readjustment—what many thought of as a picnic has turned into the most complicated mess of troubles ever faced.

Industry and business have converted production facilities far more rapidly than we thought could be done. Industry is fairly well set for fast production as far as working tools are concerned. Yet the national production line seems to be progressing in a series of irregular jerks and some sections of it are stalled.

We are still in the process of readjusting relations between government and people, between capital and labor, between the economic thinkers who fear inflation and those who fear deflation, and between those who want to rewrite the laws of supply and demand, and those who think we should let them alone.

The challenge today is a challenge to the whole gas industry. I say this because I think the whole gas industry is going to be under pressure in the next five years for the same reasons that manufacturers' organization will be under pressure. The pressure will come from the strains of growing pains and the stresses of competition. I think it is important that we recognize—utility and manufacturer—that we are both up against the self-same problems—and what is even more important—that we can solve them together better and easier than we can separately.

The gas industry is a good deal like gas itself. When gas is subjected to pressure, it can be compressed; when pressures are lightened or released, it expands.

If the gas industry does not successfully meet the pressure of growing pains and of competition to which it will surely be subjected in the next five years, the effect will be compression instead of expansion.

Gas Faces Challenge

Electricity, coal and oil—all the competitive fuels—undoubtedly have their own plans for a larger share of the domestic, commercial, and industrial fuel markets. The challenge to the gas industry is to compete with these other fuels—on fair terms—but aggressively and vigorously, so that gas may take the place to which it is entitled by its qualities and values.

Early last year it was estimated that something like 500,000 automobiles would be produced before last Christmas. Physically, the automobile plants have been reconverted from war to peace; but we still have, up to now, only a trickle of new automobiles. What is holding them up is the effort to find an equitable basis of readjustment in human relations.

As between government and the people, between management and workers, between buyers and sellers—if we are to iron out the wrinkles in our human relationships so as to be ready for the opportunities ahead of us, we must learn to understand and respect the other fellow's viewpoint and develop the willingness to take it into consideration in our plans.

Human relationships influence the material we can secure, and the shipments we can make. They influence the attitude of our customers in evaluating the manner in which we serve them. They influence every phase of gas industry service, from the point of origin of the gas, through all the different sales and trade channels, and down to the individual piece of equipment or the appliance that burns the gas. It is important that we all recognize this; it is especially necessary that utilities keep these things in mind these days in their relations with their manufacturers.

"Sales Statesmanship" Needed

I would like to suggest "Sales Statesmanship" to the gas industry as a phrase that describes the attitude we have to take in dealing with people, including the people who are our competitors, the people who work in our factories, and the people who buy our products.

As an example, let us consider just a few of the customer relation problems that today's conditions create:

There is a home owner who has

sickness in the family and he has had a new heating unit on order which he hasn't been able to get. The delivery of that heating unit seems to be, in the opinion of the customer, almost a matter of life and death.

A gas utility may have been some manufacturer's biggest customer in the past. The utility sales manager tries to be reasonable, and thinks he is, but he just can't understand why it is impossible for the manufacturer to ship at once some particular unit—it seems a relatively small favor to ask.

A builder who was aiming to put up a thousand new homes, and has three or four completed now except for the heating plants, badly needs to get his money out of these homes. This he cannot do until the missing heating plants are supplied to him.

Or, the gas appliance dealer that you have been building up and preparing for a good sales job on gas appliances may complain that you get him all excited but give him no merchandise. He points out, sarcastically, that he can't live on promises.

There are a hundred other similar cases, and the handling of these very human problems is not just a matter of one alibi or a variety of alibis.

Understanding Is Vital

Sales statesmanship is required—and this is the kind of selling that explains the problem of supply, with an understanding of the customer's predicament, and satisfies the customer at least to the extent of retaining his friendship and good will.

All of us who work in the gas industry must live with people who are asking these questions.

To practice sales statesmanship in the gas industry means handling human relationships in such a way that we not only get off the immediate hook, whatever kind of hook it is, but that we also pave the way for continuing business dealings on a friendly basis. That sounds simple, but it requires a studied effort to do it.

Everything points to a tremendous upsurge in new building construction during the next few years. More people have more money and more people need new homes. At the end of last December there were 27.2 billions of dollars of paper currency outstanding in the hands of the people. This was 12.8% more than on the same date in 1944, and was an all-time high. The government is taking urgent measures to provide homes for returned war veterans. Under anything like normal conditions, the housing shortage that has been accumulating over the past decade is due to be made up in the next few years.

We should have bright prospects in the new construction field if we can get some of the adverse pressures taken off, and meanwhile, we also have a tremendous replacement market among existing homes.

Competition will be right at our elbow all the way. Manufacturers who were leaders before the war see competition from many newcomers. Practically all of these leaders are trying to do something to meet that competition. They must not only hold the place they had before the war; they hope to improve on it.

Trade magazines report that the General Electric Co. has completely reviewed and in some ways reorganized its selling methods and organization to meet expected competition, including the establishment of quite a number of new direct factory branches.

Newcomers Enter Picture

A newcomer, the Aviation Corp., announces that it intends to take an important place in the manufacture and sale of household appliances. Certainly this means something to all the established appliance manufacturers.

Another newcomer puts together a group of wholesalers under a plan that will provide them with a full line of appliances from various unknown manufacturers, but under a single brand name such as "Monitor." Again a new factor is injected into the appliance market which spells more competition.

L. C. Harvey

STRONG AND aggressive competition —"the likes of which we have never seen" —will be jeopardizing the position of gas appliance sales once production has begun to roll, predicts Lyle C. Harvey in this article, excerpted from an address delivered before the New England Gas Association convention in Boston March 21. New industries, to date hampered by the tortures of the readjustment period, will come to the fore. Eventually, the No. 1 question facing both appliance manufacturers and the industry as a whole will not be: when will appliances be available? but rather, what will be done with all of them once they are available? The answer lies in having a sound plan for selling, and in what the author terms "Sales Statesmanship." Although the sales plan is a project for the future, sales statesmanship is an immediate program to keep prospective customers for that time when products are actually on the shelves. The GAMA president tells why he feels that merchandising is an industry-wide concern.

International Harvester's announcement that it plans to manufacture and sell farm refrigerators, freezers, and cold storage cabinets, spells new and important competition to all the established manufacturers who have expected to get a considerable part of their volume from the farm trade.

Along with these examples of new competition, consider the probable effects of the announcement that Montgomery Ward is setting up to sell bottled gas in rural and summer resort districts through its own stores, and will service its own customers out of these stores.

This in itself is enough to indicate that no one in the gas industry should rest on the belief that the present-day ease of selling, or order taking, is here to stay. It will soon be replaced by strong and aggressive competition, the likes of which we have never seen.

The number one question in the minds of most utilities today is how soon will appliances be available, in what quantity, and what will these appliances be like. Every manufacturer would like nothing better than to answer this question completely and promptly.

New Products Stymied

Most manufacturers have new products they would like to put on the market but the more pressing problems of getting under way make it very difficult to do much on new designs. They have made plans for greatly increasing their production facilities. I feel that the capacity to produce gas appliances has and is being increased from 50 to 100% over prewar. But material and other difficulties make it tremendously difficult to show such results at this time.

Most manufacturers have ready increased advertising and promotional plans which will undoubtedly be put into effect as some of the present production difficulties begin to disappear.

Every manufacturer is struggling—straining—actually sweating blood to produce a volume of his products. All this is being done in the face of reduced profit margins. This demonstrates that appliance manufacturers very definitely feel that gas is coming into its own; and they are determined to play an active part in whatever progress is made. They are determined to do a big job and have not hesitated to place their confidence in the gas industry.

There will be a volume of appliances, and many new products, all backed up with the proper advertising and promotion, just as soon as

it is humanly possible to make such deliveries.

Despite the urgent need for appliances, it still behooves the utilities to use care in making decisions as to what appliances they will promote —which manufacturers they will support.

Opportunists Pose Problem

There will be many newcomers in the gas appliance business. Some will be reliable companies who will become permanent assets to the industry. Others may prove to be merely attempting to take advantage of the present demand for gas appliances. If they lack sufficient knowledge of gas appliance design, they will offer inferior products. They will not offer sales or service assistance if they only strive to take advantage of a temporary situation. A few years from now, many of them will be out of the gas appliance business with resulting lack of replacement parts and a complete absence of responsibility.

Fortunately there are plenty of manufacturers in all four appliance divisions of the gas industry who offer not only quality products but also comprehensive national and trade advertising, sales promotional material and detailed merchandising plans, training schools, parts and service manuals and reliable field representation.

Worthy of utility support are only industry conscious manufacturers— manufacturers of quality A.G.A. approved appliances — manufacturers who are doing the kind of a reliable long-term job that will spell progress.

Now, while the No. 1 question may be: when will we get appliances? the problem that is of far more importance is: what will we do with all of them when we get them? The No. 1 problem, therefore, is whether or not we have or will have a sound plan for selling. There can be no question but what the gas industry and everyone in it must do a volume job in order to justify the investments that have been and are being made, and to capitalize on the new opportunities for expansion.

It is more important to own a market than a mill. You can build a mill in a matter of months, but you can't build a market without years of hard work and careful nursing. If the mill burns down and you still have your market, you can subcontract or do something else to get products, and still stay in business. But if you lose your market you don't need any mill.

The gas industry cannot stand still. We cannot be satisfied with the present gas load, the present volume of gas appliances now installed or our present situation in relation to competing fuels. If we are to retain our present position we must aggressively attack—strive for improvement of our service to our customers, a greater volume of gas sales, increasing sales of quality appliances. If we do not attack, we cannot possibly hold our present position. Our competitors will step in and take what we now have.

We are going to have to sell a lot of appliances—we must do a volume job. In spite of the current demand and ease of obtaining orders under present circumstances, the biggest long-term responsibility for volume sales falls on the amount and the effectiveness of the merchandising at the point of sale.

The successful merchandising of gas appliances is the real key to gas industry progress. In some cases the utility is actively engaged in an aggressive retailing program. In others the job is done by dealers. I feel that the utility companies should not only be vitally interested in this matter but should lead the way in this important activity.

There are reasons for my position. As a manufacturer I am prejudiced. More appliances will be sold if the utility sells than otherwise. But, it seems to me that the only way the utility can control the appliance or new business program is to be actively engaged in the retailing job.

Furthermore, I think it has been demonstrated that with the utility actively merchandising, the quality of the average appliance and its installation is improved. Still another very important fact is that the proper utility merchandising activity will bring more dealers into the fold than possibly can result otherwise.

But whether the utility sells or not we must have dealer sales. It is the joint problem of both utility and manufacturer to see to it that there is the proper amount of the right kind of retailing effort in each territory, area, or locality. That means whatever the area is worth in sales of gas and gas appliances. And this problem is not limited to that of selecting dealers— that's only the first step. Once selected a dealer must be educated, inspired, encouraged—in fact he must be made to produce the profit he wants and the results the gas industry must have.

Tailored Merchandising

In terms of actual work this means that we must decide just how much real appliance merchandising a community or an area should have.

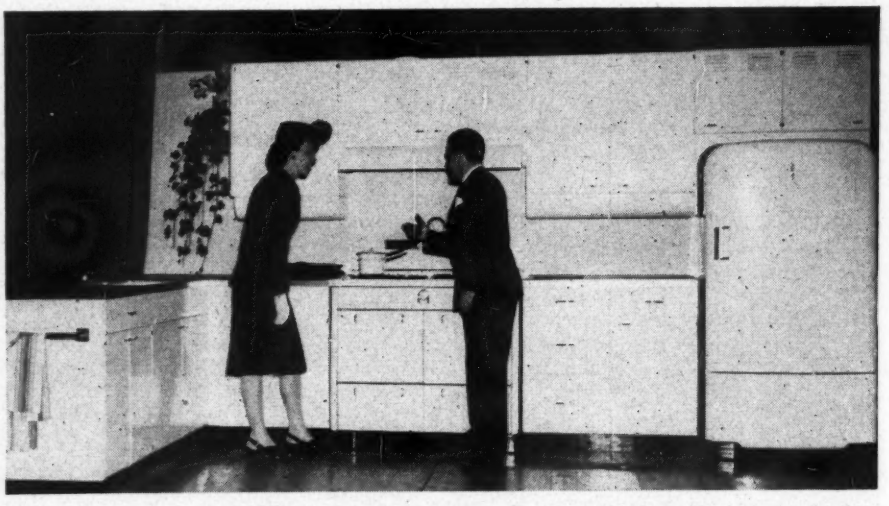
The number of dealers involved must be located, interested, and started on the program.

Each dealer must be provided with the necessary sales plan—ammunition and manpower.

We must not overlook the job of educating and inspiring the dealer and all of his personnel. We must provide advertising cooperation and see to it that each dealer gets prospects—the proper number of good live prospects, and we must see to it that he sells them—9/10 of our problem with dealers is just that—they must sell and make a profit at it!

Yes—our No. 1 problem is the retailing of gas and gas appliances.

This is the gas industry's problem —utilities and manufacturers. By joining hands they can solve it. If they do, they will march ahead together without fear of the future.



A. D. Howard, assistant sales promotion manager, Servel, assumes the role of gas company salesman and Miss Clara Ridder, home economics director, takes the part of customer to demonstrate the Servel designed New Freedom Gas Kitchen.

PATTERN FOR TRAINING

Home Service Representatives

By R. C. TERRADELL

Supervisor Sales Training, Southern California Gas Company

AN organized training program is actually an instrument which carries out the desires of management. It is a means of producing a common viewpoint among a group of employees, all of whom are "talking the same language" to the customer. This desirable objective is easier of attainment when the training material is first reconciled with the interested company departments and subsequently reviewed by management. Further assurance of uniform approaches is to be had where the training course is reproduced for distribution, not only to all employees of the work classification trained, but to interested supervision and management as well.

After the decision has been made to proceed with a training program, the first important step in its administration is to determine who will be trained. Once this has been established, the next logical consideration is to set down the detailed duties of the work classifications involved.

Job Duties: If the project is being developed for home service representative training, then a detailed statement of job duties would include such items as are listed in Table 1.

Qualifications Required: Having established the specific job activities of the home service representative, the third step in developing a training program would consist of outlining the qualifications which a candidate should possess to enable her to perform the duties of such a work assignment. Certain of these qualifications would be looked for, and obtained, by the local selection and hiring methods, while other special abilities would have to be developed through training following employment.

Basing the list of personal requirements on the proposed job duties, it would appear that the home service representative should have the qualifications listed in Table 2.

Training Prospectus: Step four in establishing the training program is the presentation of a prospectus, outlining the suggested course of training. This should outline the job duties, requirements, curriculum, method of presentation, training facilities (classroom, equipment, audio and visual aids, etc.), approximate length of the training period, its approximate over-all cost and cost per student. When completed, this prospectus should be submitted to management for review and approval before the actual work of preparing the course of training is begun.

Course Material: Using the many national and local references as source material, classroom presentations should then be written in the form of lectures following the demonstration, discussion and group participation pattern program. Using the list of requirements previously outlined, which in turn were based on the job duties to be performed, each lecture is thus aimed at a definite training objective.

Training Aids: It is suggested that consideration be given to visual, audio and other training aids which will be used to administer each component lecture of the course, so that such provisions can be "written in" as they apply. Art work, such as diagrams, schematic drawings, or platform arrangements should also be included as well as photographs which are proposed for stereoptican projection. Each lecture, when completed would then represent a complete unit.

Departmental Viewpoints: Lectures which are confined to separate subjects are easily reviewed by the interested departments during the course of reconciliation, which should always precede the final review by management. They have the added advantage of being more "wieldly" in an instructor's hands, since consideration need only be given to equipment and supplies for a single training project. Furthermore, the student's attention is focused on limited subject matter which improves his learning process.

Once all viewpoints have been reconciled with the interested company departments, followed by management's review and approval, classroom facilities and teaching properties become the next order of business, since by then these requirements will be definitely known.

Classroom Facilities: A classroom should be set aside for instruction purposes, adequately equipped to accommodate the largest number of students anticipated at one time. Such a room should have a model kitchen installed at one end—preferably on a raised platform. At this end of the room

R. C. Terradell

MR. TERRADELL in this article states that an organized training program is an instrument of management which produces a common viewpoint among a group of employees, all of whom are "talking the same language" to the customer. The present article which deals with home service representatives takes up job duties, qualifications required, the training prospectus, the course material, training aids, departmental viewpoints, classroom facilities, the instructor, administrative routines, the curriculum, and the classroom presentation.

Mr. Terradell has been associated with Southern California Gas Co. and Los Angeles Gas & Electric Corp. since 1927, starting as a field appliance adjustor in the customers service department. In 1932 he was engineer in charge of distribution pipe line maintenance and replacement. In 1937 he was transferred to the personnel department, becoming employee training supervisor in 1940. He has been active in customers service, gas appliance dealer installer, street department and butadiene training. In 1945 he entered his present position as sales training supervisor. This paper was prepared for the Home Service Work Shop sponsored by the Home Service committees of the American Gas and Pacific Coast Gas Associations.

TABLE 1. JOB DUTIES OF HOME SERVICE REPRESENTATIVES

1. Select, store, preserve, prepare and cook foods of all types.
2. Using approved cooking principles bake cakes, pies, cookies and hot breads. Cook vegetables both by the oven or top burner method.
3. Bake, roast, stew, fry and broil all kinds and cuts of meat applying the recommended method to the cut of meat involved.
4. Bake, fry and broil fish and other sea food as the method applies.
5. Roast, stew and fry all kinds of fowl.
6. Can and dehydrate fruits and vegetables.
7. Prepare jellies, jams, preserves and relishes.
8. Pickle vegetables and fruits.
9. Disseminate information on nutrition principles.
10. Conduct public demonstrations of the foregoing processes.
11. Make request home service calls prompted by the customer's desire for assistance on food refrigeration, baking, a specific cooking problem, or some other household process or appliance which company policy includes within the scope of the Home Service Department's activities.
12. Make out reports (a) Narrative type (b) Forms (designate which ones).
13. Use the telephone to take incoming calls from the customer and other company departments, or to make calls to customers or other company departments.
14. Answer questions pertaining to the gas industry in general, the company and the Sales Department, questions about gas, the fuel, and its utilization, and finally answer those questions on any phase of the established Home Service Department's activities and functions.
15. When in the customer's home appraise the condition and adjustment of appliances falling within the scope of the Home Service Department's activities.
16. Make minor adjustments on range top and oven burners and pilots. (If company policy permits).
17. Calibrate range oven controls. (If company policy permits.)
18. Check the levelness of range ovens.

TABLE 2. QUALIFICATIONS OF HOME SERVICE REPRESENTATIVES

1. Be mentally and physically qualified for the assignment.
2. Be adequately trained in home economics.
3. Be well grounded in her knowledge of the gas industry, and be familiar with manufacturers' products involved in her work. She should know the purpose and functions of the American Gas Association and her local gas association.
4. Be familiar with the work of the A.G.A. Testing Laboratories and those of her company, if one is maintained.
5. Know her company's procedure in the production (or manufacture), transmission, compression, storage, regulation, measurement, distribution and sale of gas.
6. Be familiar with combustion, flame characteristics, fundamentals of burner design, venting, and utilization of gas in domestic appliances with particular emphasis on the range and refrigerator.
7. Be able to calibrate domestic gas range ovens and make simple gas air adjustments on range top and oven burners. She should be able to make pilot adjustments.
8. Know the geographic and departmental organization of her company, with particular emphasis on the Sales Department's organization, funtions and policies.
9. Have knowledge of current, pertinent appliance information.
10. Be familiar with the Service Department's organization, functions and policies.
11. Be able to use whatever tools, special instruments and utensils are required to execute the established duties of her work classification.

    For example:

Oven thermometer	*Dehydration equipment
Spirit level	Measuring cups
Screw driver	Measuring spoons
Pliers	Layer cake pans
Adjustable open end wrench	Pie pans
*Pressure cooker	Cookie sheet
	Spatula

12. Have on hand and know how to use company recipes, and other literature.
13. Know the public relations policy of her company.
14. Know how to dress appropriately for the work.
15. Know how to drive an automobile.
16. Know how to use maps.
17. Have the ability to write reports (as required).
18. Know proper telephone technique.

*With these exceptions the other equipment listed under paragraph 11 should be issued to the candidate.

there should also be a screen mounted on a roller near the ceiling on which stereoptican slides, sound slide film strips and motion pictures could be projected as required.

Blackboard facilities should also be available. In some companies, where space limitations would preclude setting a room aside strictly for training purposes, an existing auditorium could probably serve as a classroom, providing meeting conflictions did not present too great a problem.

Where the existing training facilities of the Service Department were unavailable for use in presenting the utilization phase of the training program, provisions should be made for the installation of operative representative types of gas appliances along either wall of the classroom. Cutaway companion models would represent an ideal well worth striving to attain. Discussion periods, conducted to better advantage in an informal manner, can be held while seated around a table in the center of the room. Such a table, preferably of oblong shape, can also serve when written quiz sessions are held. The general arrangement for such a classroom is shown in Fig. 1.

The Instructor: In selecting an instructor for the teaching assignment, careful consideration should be given to the employee's personal makeup: background of experience and training, her overall knowledge of the subject matter to be taught, and finally her interest in the assignment. In fact, any qualities possessed by the instructor which will generate a desire on the part of the student to meet the job requirements will represent a satisfactory candidate for this assignment.

Administration Routines: The home service director should next review the program in considerable detail with the instructor. Besides the general plan, objectives, and training policies, it is essential that the instructor be advised of the specific training routines desired, the method of administration, and critical standards which the student will be expected to meet. It would help considerably if the home service director herself actually gave the course to the instructor. Where her departmental activities preclude this, the director should provide ample time for the instructor to develop the training routines, properties, etc., under her supervision.

In some companies, where the personnel limitations of the Home Service Department would not permit the assignment of instruction duties to a single individual, it may be necessary for the home service director to carry

on this activity with some assistance from other company departments on topics not directly involved in home service work.

Curriculum: Designed to qualify the student home service representative to meet the requirements of her future work assignment, a curriculum is suggested in Table 3.

Classroom Presentation: To illustrate a typical classroom presentation method which could be adapted to any subject in the foregoing curriculum, it can be assumed that the instructor proposes to conduct a class on "demonstration assignments". After the attendance record has been made, the instructor should clearly state the nature of the day's class, what the objectives are, what method will be used, and what is expected of the student, followed immediately by the comment that the instructor's expectations will not be unreasonable. After these remarks the instructor should invite questions by the student on those points which are not clear as the class progresses, assuring the student that this is her means of knowing if the subject fails to "get across". A topical outline indicating the order in which material would be covered through group participation is shown in Table 4.

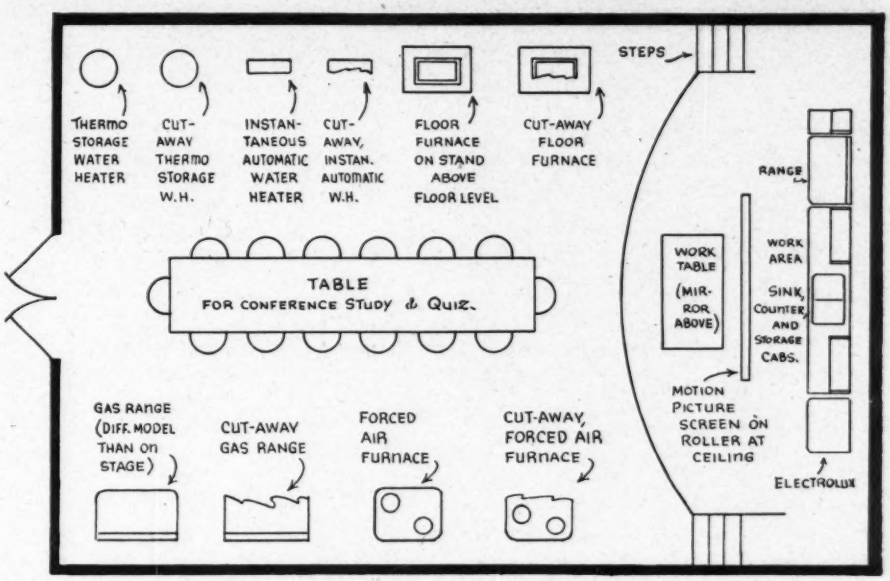


Fig. 1. Classroom Section.

At the earliest available opportunity, the student should be scheduled to conduct a public demonstration with the instructor present back stage to render any help before, during and after the presentation. The manner in which the assignment was completed, and its effectiveness is recorded under "results" in the student's training file on the summary sheet (Fig. 3) which is forwarded to the home service director.

In this manner the training progresses throughout the complete course, the instructor advising the student of any adverse trends as they develop and soliciting the student to inquire concerning her progress at any time convenient to her.

General Considerations: It is recommended that the training be continuous and unbroken throughout the entire course, rather than be conducted on a "stop and go" basis. This is particularly important where new people are involved, since their early impressions are shaped by the presentation of valid information. They run less risk of developing faulty work habits which are hard to over-

TABLE 3.
SUGGESTED CURRICULUM

Gas Industry
- American Gas Association
- Pacific Coast Gas Association
- Gas Appliance Manufacturers Assn.
- American Standards Association

Company
- Geographic organization
- Departmental organization
  - Policies and functions of Sales Department and Home Service Department

Gas (Fig. 2)
- Production
- Transmission
- Storage
- Distribution
- Regulation
- Measurement
- Combustion—flame characteristics
- Utilization—burner design, domestic appliances

Home Service Functions
- Cooking principles
  - Cakes
  - Pies
  - Cookies
  - Vegetables
  - Meat
  - Canning
- Utilization principles
- Request home calls
- Baking complaint calls
- Demonstration assignment
  - Arranging for one
  - Timing it
  - Dressing for it.
  - Preparing food for it

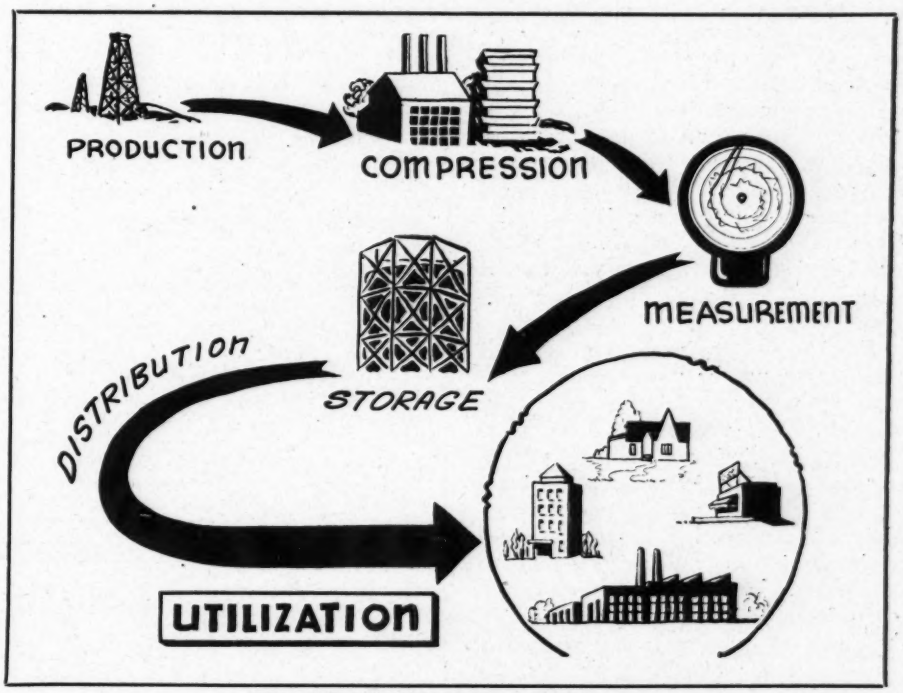


Fig. 2. Graphic Illustration of Lecture.

TABLE 4. OUTLINE FOR GROUP PARTICIPATION

I. Public relations aspects.
   (a) Discussion of background considerations.
   (b) Proper dress.
   (c) Acceptable decorum.

II. Stage setting arranged with explanation.
   (a) Placement of work table.
   (b) Placement of food.
   (c) Placement of utensils.
   (d) Lighting effects.
   (e) Use of sound equipment.

III. Disorganize stage setting after which the student reorganizes it with explanation. Errors are corrected by the instructor as they occur, and supplemental explanations given. If the number of errors, or their seriousness justify repeating the operation, this is done.

IV. Explain how food will be used.

V. Instructor conducts the demonstration.

VI. Student conducts the demonstration (Errors are corrected, etc.).

VII. Appropriate dress for demonstration assignments.

come, and the probability of policy misinterpretations is also limited. The controlled logical sequence in which their training progresses during a "non stop" course produces qualified, productive employees at a more rapid rate.

Critical performance standards should be established early so that the results of training can be measured during, and at the completion of the course. Besides being helpful in determining the effectiveness of the program, such standards increase the probability of releasing qualified personnel for work assignment. Objective measurements, while highly desirable, may not be developed readily for every phase of the work, in which case less tangible appraisals must be employed, based on the instructor's personal opinion. All measurement standards, nevertheless, should be based on the criterion of satisfactory work performance by existing home service representatives, who are the ones the home service director is attempting to match. By administering all tests, whether of the written or performance type, to the existing satisfactory home service representatives first, the instructor is enabled to improve their validity for student use later.

To insure maximum control, all training should be given on company time with provision made for study periods during class sessions. This policy will eliminate the handicap of a fatigue factor, increase student cooperation, and result in greater receptivity. The instructor, however, should maintain a neutral attitude toward home study by neither discouraging it, or pointedly encouraging such effort. Texts in the form of lecture reproductions, passed out to the students at the conclusion of each lecture, will make it possible for students to engage in outside review if they so desire. If they prefer not to study on their own time, not much harm results if they have been well taught in class.

Conclusion: This discussion has been offered as a general approach to home service training rather than as a detailed statement of procedure. It is submitted as a starting point from which such a training program can be developed to meet the particular local requirements of a utility not so engaged. Its purpose is to provide a pattern for training designed to qualify candidates in the shortest period of time at the least expense.

Since the subject of training lends itself readily to controversy, it is important to review carefully the possibilities of any program which is under consideration before making changes arbitrarily. Past experience and tested methods are two means of forecasting the probability of future success with reasonable accuracy. The best criteria, however, are the results which are obtained after the plan has been put into effect. Modifications, additions, and deletions can then be made to attain specific objectives.

HOME SERVICE TRAINING

A.B.C. GAS COMPANY

Date Entered Training_____ Name_____

Title_____ From_____

Date Training Completed_____ Released to_____

Basic Training	Cooking Principles	Cakes	Pies	Cookies	Veg.	Meat	Canning	Nutrition Principles	Request Home Calls	Baking Complaint Call (Oven calibrations)	Demonstrations
1/15	2/1	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/12
Passed	Passed	Passed	Passed	Borderline	Passed	Passed	Passed	Passed	Passed	Passed	Passed

Interview 2/6 _____ (Record details of interview)

Interview 2/15 _____ (Record details of interview)

Recommendations _____

Instructor _____

Fig. 3. Summary Sheet.

The VALUE of the AIRPLANE in Patrolling Pipe Lines

By O. D. HALL, Mid-Continent Editor

SEVERAL firms organized for patrolling oil, gas and gasoline lines in the Mid-continent areas are putting "Seven League" boots on pipe line walkers. These organizations, often headed or manned by returned pilots from the war, already are patrolling thousands of miles of lines each week, and are seeking to extend their services more generally to natural gas utilities as well as to the oil companies.

While some pipe line patrolling was done before the war, the business has been given impetus by sale of surplus light planes and return of many pilots seeking outlet for their skills. As in any other new industry a big selling job for air patrolling remains to be done, particularly to the natural gas companies of the area, most of whom still adhere to the older and more conventional pipe line walking methods.

One natural gas company which operates in the Mississippi river valley has been using airplanes to patrol its lines for nearly 16 years. This practice has not eliminated necessary patrolling by foot but has reduced frequency of ground patrols.

This company uses a cabin plane with a 175 hp engine and flys at an average altitude of 200 ft. It covers on an average of 440 miles of its line per day at an average cost of $17 per flying hour.

Such things as broken telephone poles, trees fallen across the pipe line right-of-way, trees leaning on telephone wires, leaks and conditions that may cause leaks, structures being erected near the route of the pipe line and washouts along the right-of-way are reported by the pilot to this company.

Among the air patrolling firms now operating in the Mid-continent area are the Overstreet & Clay Co. of Oklahoma City; and Kaw Pipeline Co., Tulsa, owned jointly by the Cities Service Oil Co. and by several individual flyers seeking profitable outlets for their skills.

The Oklahoma City firm is composed of Henry Clay and Hollis L. Overstreet, both returned World War II veterans. This company, organized last August, has expanded until it makes weekly air patrols from Borger, Texas, to Chicago and from Oklahoma City to Kansas City, covering 3100 miles of oil and gasoline pipe lines. The Tulsa company covers 1000 miles each week of pipe lines of the Texas Co. and the Phillips Petroleum Co., in the area around Lyons and Hayes in Kansas.

The manufacturers of the Sikorsky helicopter plan a series of demonstrations with the hope of proving the possibilities of that type of craft in patrolling where flying low, at slow speeds, has advantages. A tentative schedule of places where these demonstrations will be made during the spring or summer includes: New York, Pittsburgh, St. Louis, Independence, Kan., Bartlesville, Tulsa and Oklahoma City, in Oklahoma; Dallas and Houston in Texas. Ability of the helicopter to fly forward, backward or sideways; to go up or down almost perpendicularly, and to hover or land on a small rough spot, is being held out by makers of this craft as a reason why it easily can be adapted to patrol of pipe lines

Light conventional-type airplanes, equipped with engines of from 90 to 125 hp, flying at speeds averaging 85 miles per hour with easy maneuverability and comparatively simple instrument boards, are being most commonly used at this time for patrolling pipe lines. These are flown from 200 to 1000 ft. above the ground, sometimes descending to altitudes of 100 ft. when closer observation is desired. Average flying elevations are from 200 to 300 ft. during patrolling operations.

The plain pathway of an oil or gas line as seen from the air, aids pilots in keeping the noses of their planes over the course during their regular patrols to locate leaks, erosion damage or other sources of trouble.

INCREASING USE is being found for the airplane in the patrolling of long distance transmission pipe lines. One natural gas company, as Mr. Hall states in this article, has been using the airplane for this work for 16 years, and while its use has not eliminated the necessity for pipe walking, it has reduced the frequency of ground patrols. Speed and position of observation are, of course, the primary advantages which air patrolling has to offer. Leaks and evidence of erosion or other conditions which may lead to a pipe line break may usually be quickly reported and in more detail. The airplane, however, does not solve all leak location problems. Small leaks are difficult, if not impossible, to perceive from the air. In this article Mr. Hall discusses some of the airplane types used for this type of work together with some of the advantages and disadvantages of air patrolling.

It is easy for the trained pilot, equipped with a map of the pipe line system he is patrolling, to keep the nose of his plane over the unmistakable trail of a pipe line. These lines leave paths through forests, over hills and through valleys as if a giant had walked there (Fig. 1). Only in places, such as ploughed fields and tall stands of wheat or corn, or crossing streams, are the marks of the pipe line dim or obliterated but from his elevation the pilot can easily pick up the path of the pipe line again.

Air patrolling is particularly well adapted to discovery of leaks, breaks and other forms of damage along oil and gasoline pipe lines, the pilots say. An oil line leak leaves a spot resembling, from the air, a blot of ink spilled on the landscape. A gasoline pipe line break sometimes reveals its location by a small fountain of mist or spray. A break in a natural gas pipe line in soft ground throws up a mound like a small volcano, or if it is

under water the surface bubbles or sprays upward.

Mr. Overstreet of the Clay-Overstreet firm says that when he sights a leak or break, he banks his plane into a hawk-like spiral and circles the spot checking his exact location. He then records the position on his map, writes a note giving the information, places it in a tube and drops it to the attendant at the nearest pumping or compressor station.

"Under pipe line walking methods the elapsed time of reporting leaks or breaks varies with the frequency of the patrols up to two weeks," said Mr. Clay. "Under air patrol methods the average time is reduced to four days. Where reports are made to stations equipped with telephone service the reporting is a matter of minutes, and where the patrolling plane and the company pipe line stations are equipped with two-way radio the reporting usually is immediate."

Air vs. Ground Patrol

An executive of one of the big natural gas transmission and distribution companies said that in the case of a utility like his own which has telephone communication service along all or most of its lines, reporting by the pipe line walking method also is reduced to hours and sometimes even to minutes. In the various compressor stations along his lines there are sensitive pressure recording and measuring instruments which record pressure changes or line losses.

A leak or break in a line cannot escape the attention of the station attendant or chart reader. A few minutes of telephonic exchange of information between stations will reveal the approximate location of the break and pipe line walkers can easily reach it and repair it within a few minutes or hours.

This executive admitted only two advantages of air patrol if employed on properties such as his: greater speed in getting over the lines and quicker discovery of erosion damage. He believes that for several operations in pipe line patrolling as practiced by his company, the walking system is superior, although he has not tried the air method.

This gas company employs what it calls the "relay" system. A crew qualified to walk lines, read meters and make other ground inspections, and with ability and tools to make quick repairs, is sent out from the station nearest the proposed starting point in two automobiles. A part of the crew unloads at the starting point and begins patrolling its sector. The remaining members proceed in the second automobile to the next sector to be patrolled and start work. When crew No. 1 has completed its work it proceeds in its automobile to a sector beyond crew No. 2 and begins walking. By thus relaying its operations, a saving of about half in walking time and in elapsed time for completing the patrol of a given line, is accomplished.

Adherents of patrolling by air and by walking agree that small gas leaks are more easily discovered from the ground. When ground patrolmen are walking into the face of the wind such leaks are often discoverable through the sense of smell, whereas such discernment would be difficult, if not impossible, from the air.

Air patrolling pilots claim superiority in detecting damage to crops from leaks or breaks, which are more easily discovered from an elevated position, particularly if they are located in tall wheat or corn or on a branch line leading off from the main line. Gas companies and patrol pilots agree that most of the leaks or breaks which result in crop damage are reported to the gas or oil companies by farmers along the lines. But the pilots claim that such crop damage can become serious if not discovered quickly, particularly on oil and gasoline lines. Natural gas leaks operate more slowly to cause damage. These dry out the soil around the roots of the plants.

Among other advantages claimed for air patrolling are the earlier discovery of construction projects such as irrigation ditches, farm ponds, and highways which at the time may not parallel the pipe line but which may eventually cross and damage the pipe line by exposing pipe or causing flooding or erosion. Better observation of general flood, storm or erosion damage, or in reporting damage to lines or other company property in more inaccessible location or in times when deep snow or floods make sectors of the lines difficult or impossible to approach, is claimed for the air patrolling method.

Costs Not Established

No comparable figures on costs were available to this correspondent except general statements from air patrol pilots based on their experience and observations. Mr. Clay said that the cost of patrolling by the pipe line walking method averages from $1 to $2 per mile per week. He claims that air patrolling can accomplish better and far quicker results at one-fifth the cost per mile, per week.

Several variable elements make accurate comparisons of costs difficult. Methods of pipe line patrolling by walking vary widely. Costs go up or down proportionately to the frequency of the patrols, the size of the crew, the various operations they are expected to perform while out on the line. If these ground crews do work on the ground which could not or would not be performed by air patrols, such costs would not compare with the patrolling.

Larger models of helicopters such as shown here over a golf course may demonstrate their usefulness in carrying repair and maintenance crews to breaks in gas or oil pipe lines in remote or difficult locations.

SMALL DEHYDRATOR

To Prevent Freeze-Ups of Pilot Regulators

By LAURANCE S. REID

Professor of Chemical Engineering, The University of Oklahoma, Norman.

THIS ARTICLE describes the design and construction of a small dehydrator for pilot regulator supply gas which has been successfully used by the Southern Natural Gas Co. to prevent pilot regulator freeze-ups, thus avoiding loss of pressure and ultimate failure on the downstream side of the regulator setting. This study by Prof. Reid, who was formerly assistant chief engineer for Southern Natural, was first published in the "Petroleum Engineer." Because of its interest to those engaged in gas transmission it is reprinted herewith.

FREEZING of pressure regulators is a common occurrence during cold weather, particularly when handling wet or partially dehydrated gas. Small pilot regulators on pilot-loaded installations seem to be especially subject to freezing, causing loss of pressure and ultimate failure on the downstream side of the main regulator setting. Heated regulator houses, pipe line heaters, substitution of weight-loaded diaphragms, and numerous other devices have been used to insure against pilot regulator freeze-ups, but many of these are costly and others result in poor regulation.

Experience in the dehydration of large volumes of natural gas by means of adsorption of water vapor on activated alumina has led to the development and successful use of a small dehydrator for pilot regulator supply gas. This basic idea may be applied wherever pilot-loaded controls are used by modifying the design according to pressure requirements.

Design and Construction

The unit discussed here is suitable for operating pressures up to 500 psi. The assembled unit is shown in Fig. 1. Wet gas enters the manifold and is diverted to the dehydrator, entering the vessel at the top. The gas passes downward through a bed of activated alumina and gives up its water, leaves the vessel at the base, and passes to the pilot regulator. A bypass is provided so that the alumina may be changed without disrupting service. A bill of material is shown in Fig. 1 and it should be noted that the manifold is assembled with standard ¼-in. nipples so that only one piece of pipe must be cut to fit.

Structural details of the dehydrator vessel are shown in Fig. 2. Although the drawing specifies a Van Stone flange, it is obvious that a welding neck, slip-on, or back-welded screwed flange may be used. Old cast-iron or defective steel flanges make an ideal base plate. When the gasoline content of the gas is high, a drain should be installed in the bottom head of the vessel.

Details of the alumina canister are shown in Fig. 3. The canister may be made of salvaged 3½-in. O.D. boiler tube and light gaze sheet metal throughout. It consists of a top flange, sized to clamp between the flanges of the pressure vessel, welded to a boiler tube 3½ in. O.D. by 29½ in. long. A perforated 10-gage plate is welded to the bottom of the tube. Four ⅛-in. bolts are tapped and sweated into this plate in order to clamp two layers of common household screen wire between it and a second plate with matching perforations. The two layers of screen wire mesh should be revolved through an angle of 45° to obtain the smallest openings. A round bar handle is welded to the top end of the tube, as shown, to facilitate handling the canister.

Capacity of the Unit

New activated alumina has an adsorptive capacity for water up to approximately 11% by weight. Contamination from lubricating oil, absorber

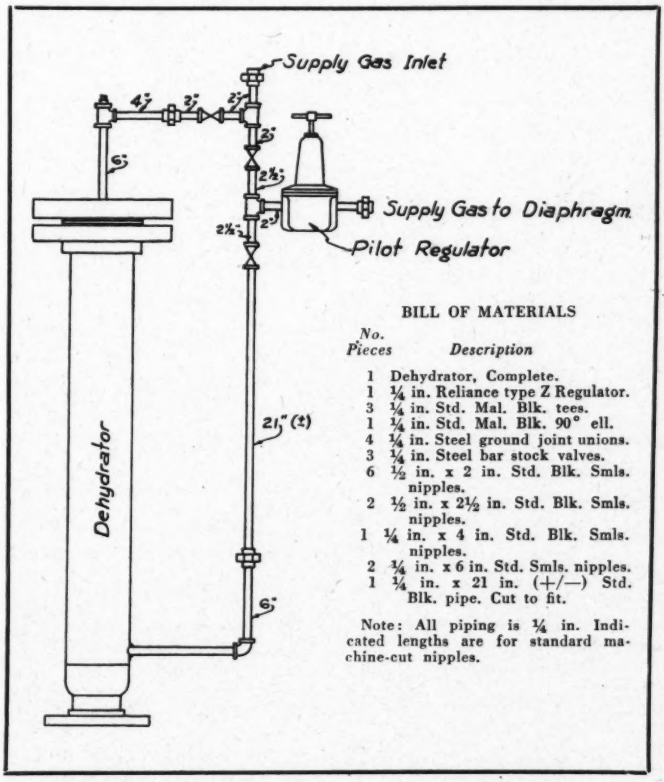

Supply Gas Inlet
Supply Gas to Diaphragm
Pilot Regulator
Dehydrator
21" (±)
6"
BILL OF MATERIALS
No. Pieces — Description
1 Dehydrator, Complete.
1 ¼ in. Reliance type Z Regulator.
3 ¼ in. Std. Mal. Blk. tees.
1 ¼ in. Std. Mal. Blk. 90° ell.
4 ¼ in. Steel ground joint unions.
3 ¼ in. Steel bar stock valves.
6 ½ in. x 2 in. Std. Blk. Smls. nipples.
2 ½ in. x 2½ in. Std. Blk. Smls. nipples.
1 ¼ in. x 4 in. Std. Blk. Smls. nipples.
2 ¼ in. x 6 in. Std. Smls. nipples.
1 ¼ in. x 21 in. (+/—) Std. Blk. pipe. Cut to fit.
Note: All piping is ¼ in. Indicated lengths are for standard machine-cut nipples.

FIG. 1. Assembly of dehydrator and pilot regulator.

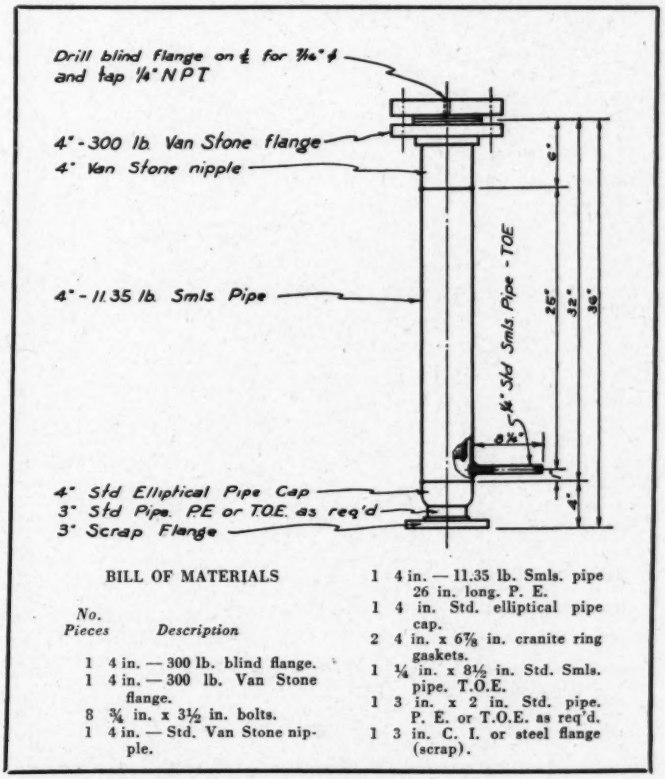

Drill blind flange on ℄ for ⅞" ϕ and tap ¼" NPT
4" - 300 lb. Van Stone flange
4" Van Stone nipple
4" - 11.35 lb. Smls. Pipe
4" Std Elliptical Pipe Cap
3" Std Pipe. P.E or T.O.E. as req'd
3" Scrap Flange
¼" Std Smls Pipe - T.O.E
BILL OF MATERIALS
No. Pieces — Description
1 4 in. — 300 lb. blind flange.
1 4 in. — 300 lb. Van Stone flange.
8 ¾ in. x 3½ in. bolts.
1 4 in. — Std. Van Stone nipple.
1 4 in. — 11.35 lb. Smls. pipe 26 in. long. P. E.
1 4 in. Std. elliptical pipe cap.
2 4 in. x 6⅞ in. cranite ring gaskets.
1 ¼ in. x 8½ in. Std. Smls. pipe. T.O.E.
1 3 in. x 2 in. Std. pipe. P. E. or T.O.E. as req'd.
1 3 in. C. I. or steel flange (scrap).

FIG. 2. Details of dehydrator vessel.

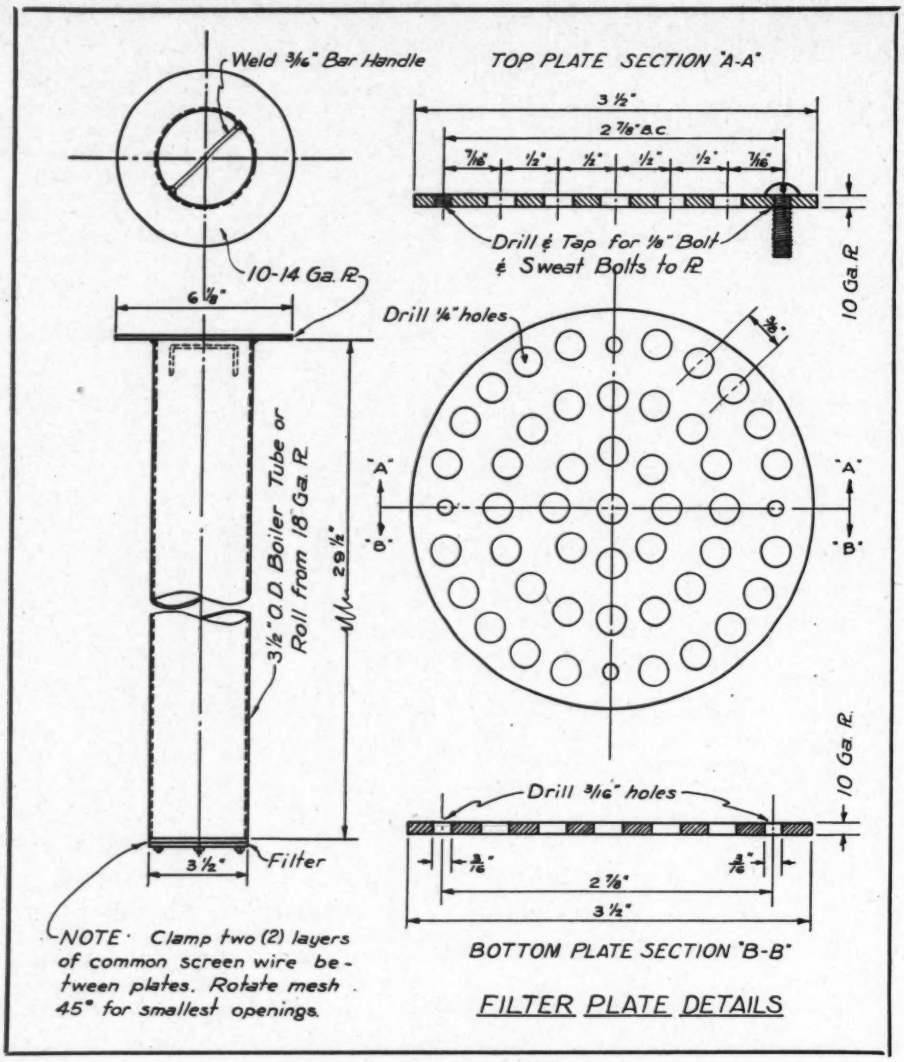


FIG. 3. Absorbent canister details.

oil, gasoline, glycol, and sulphur compounds all affect the capacity adversely so that an average capacity of 5% by weight is assumed to insure an adequate safety factor for operation under usual conditions. Alumina has a bulk density of 50 lb. per cu. ft. and a properly packed canister will hold 6¾ lb. of this material. Based on a capacity of 5% by weight, this alumina will take up 0.3375 lb. of water.

If, for example, the gas handled by the regulator had a dew point of 50° F. at 400 psi gage, its water content would be 24 lb. per million standard cu. ft or 0.024 lb. per Mcf. Therefore, the alumina would dry approximately 14 Mcf of supply gas passing to the pilot regulator. It is obvious that the service life of each charge will depend upon the rate at which gas is bled off the regulator diaphragm. Table 1 shows the effect of variation in this rate upon the service life, based on gas carrying 0.024 lb. of water per Mcf.

[1]"Natural Gas Pipe Line Dehydration," by Henry N. Wade, *The Petroleum Engineer*, April, 1943, P. 102.

In designing a pilot regulator dehydrator for a specific use, particular attention should be given to the water content of the gas supplied to the regulator to insure adequate adsorptive capacity. The large quantities of water vapor contained in gas saturated at pressures up to 200 psi would require a larger unit than the one shown here. Smaller units to process gas at higher pressures would likely be limited to a 3-in. dehydrator vessel because of mechanical difficulties in fabricating an adsorbent canister.

Operating Practice

This unit is designed to use 4-8 mesh activated alumina. Our experience is limited to Alumina-A, produced by the Aluminum Ore Co., and Florite, produced by the Floridin Co. Both materials have given good results in this service.

Great care must be exercised in charging the unit with adsorbent to avoid excessive fracture and dusting. Have the empty canister ready to fill before opening the sealed packages of adsorbent in order to prevent excessive exposure to the atmosphere and preserve maximum capacity. Tilt the canister sharply to one side and pour the adsorbent in, allowing it to slide down the inclined surface. Avoid a free fall. When full, raise to an upright position and tap the canister sides sharply to settle the adsorbent, then fill to within ½ in. of the handle and install the canister in the dehydrator vessel. When tight, disconnect the union on the outlet line and gently blow all dust from the vessel and lines that otherwise might plug the regulator. Connect the union and pressure the vessel slowly through the inlet valve. Open the discharge and close the bypass and the unit is in service. For best results, set or check the bleeder rate with a positive meter, tag the dehydrator showing the date the last change was made and the date the next change is due, and keep a fresh charge of adsorbent available.

Regeneration of Adsorbent

In some cases it may be desired to regenerate the spent alumina. This may be done by heating the material to not more than 350° F in a closed retort, under vacuum. Maintain this temperature and vacuum for 2 hr., then cut the fire and allow the retort to cool. Release the vacuum, open the retort and seal the adsorbent in air-tight containers as quickly as possible. Mason-type fruit jars are entirely satisfactory for this purpose.

Do not attempt to regenerate this material in an open-flame domestic oven, for alumina will absorb substantial quantities of gasoline.

Obviously, supply gas for any pneumatic control may be dehydrated by means of an apparatus similar to that described here. Furthermore, it is now proposed to apply the basic principle of the small dehydrator to the prevention of freezing in orifice meter manifolds on high-pressure gas wells.

Regardless of the application, service men must know how and why the units work and they must appreciate their limitations to obtain the best results. Successful operation is attested by the eight pilot regulator dehydrators now in service on the Southern Natural Gas Co.'s system.

TABLE 1. Effect of variation in the rate of gas bled from the regulator diaphragm on the service life of the dehydrator charge.

Hourly rate of flow from bleeder valve, std. cu. ft.	*Maximum number of days in service*
10	58
15	39
20	29
25	23
30	19

Prospects of Competition for the
COMMERCIAL COOKING LOAD

By L. L. PETERS,
Sales Manager, Southeastern Sales Division, American Stove Co.

COMMERCIAL cooking is one of the most important gas markets today. Both from the standpoint of percentage of load and of rates it stands high in the gas industry, and in the future it will require even more consideration than it has in the past. And so it is logical to ask: what of our competition?

As a means of answering this question, a questionnaire was mailed to a cross section of the membership of the Southern Gas Association on Feb. 25, 1946, requesting information as to competitive fuels in 1941, in 1946, and opinion as to 1951. Information was also requested as to popularity of fuels for the specific cooking services in commercial kitchens, that is, ranges, fryers, counter equipment, and bake ovens.

Response Enthusiastic

Most of the questionnaires were promptly completed and returned; in fact, more than 90% were returned and a cross section of each state in the association is available. This shows a great interest in this phase of the industry and some concern as to our future competitive sitation.

A resume of state-wide competitive conditions and trends is shown in the accompanying table.

But even more interesting are comments from the completed questionnaires; some are as follows:

"The electric industry has been increasingly active in attempts to secure a part of the commercial cooking load. The reasons for the limited success which they have so far attained is believed to be active sales efforts on the part of electric companies, effects of national advertising by manufacturers of commercial electric equipment in monthly magazines and the stimulus in certain localities caused by the prospect and discussion of cheap electric power from proposed hydro-electric projects.

"To date the electric industry has concentrated on the sale of deep fat fryers and bake ovens. We believe that their reasons for doing so is that the fryers and ovens are probably the best commercial electric appliances available and that they are attempting to obtain a foothold in the commercial cooking field by securing the installation of appliances which they believe will give superior performances. If this is their plan, we will later face added competition by the electric industry for all of the commercial cooking load. Their sales effort will be strengthened by the argument that additional electric cooking equipment can be operated very cheaply on the comparatively low increment rate for additional service."

"Counter appliances are gradually getting away from gas fuel."

"We find that competition is less difficult where a gas utility offers good service on commercial cooking equipment such as: monthly cleaning, inspection, and regular repair service. If it were not for this, we would have more difficulty retaining this business."

"No active competition from any fuel except electricity."

THE COMMERCIAL cooking load need not be lost to electricity in spite of the inroads being made into gas sales in this field, says L. L. Peters, manager, Southeastern Sales Division, American Stove Co., in this paper, which was delivered at the Southern Gas Association meeting in Galveston, Texas, in March. A survey of 13 southern states, herein tabulated and reported upon, revealed that there is a growing tendency toward the use of electricity, especially in the manufactured gas areas, and that by 1951 this tendency might well have attained serious proportions. Act now, the author advises, in order to combat this tendency. A stepped-up program must be instituted immediately if gas is to hold its place and to gain from its competitors new business.

A native Georgian, the author has been in the merchandising field since 1928, beginning with the Georgia Power Co. at Brunswick as a salesman. He was appointed sales manager of the Columbus (Ga.) district of the same firm in 1934. With the American Stove Co. since 1940, he became sales division manager Jan. 1, 1944.

L. L. Peters

"While gas is at present the predominant fuel for commercial cooking, we expect some serious attempt to snatch a great part of this load in the future, mainly through the sale of counter equipment, deep fat fryers, and bake ovens. Unless modernistic and improved gas counter appliances, improved fryers and bake ovens are made available, we shall have a real fight on our hands."

"The expected tourist trade is bound to open up many new, modern eating places along the outskirts of our cities and towns where gas is not now available and some means, such as bottled gas, should be provided in order to meet electric competition before it gets to our present lines. In this manner we could preserve our load until such time as it was expedient to run necessary mains to serve."

Better Service Needed

"Many men who have been cooks in the navy are going to return to civilian life after having used electric ranges aboard ship and they are going to want or try to influence their employers to change to electricity for cooking. Our hope in combating this competition is to give better and more service."

"Gas dominates our market here. Electricity is negligible but is beginning to show signs of aggressiveness—particularly in the deep fat fryer field."

"For gas to continue to be competitive or to continue as first choice as a commercial fuel the gas industry should have more gas equipment for counter and small restaurant use that is competitive with electric equipment. A commercial gas refrigerator is needed."

"We are currently losing two of our major kitchens to electrical equipment."

"We maintain a monthly free inspection service to all of our commercial users which we think is helpful in getting and holding this class of business."

"No competition now."

"We employ a full time qualified commercial gas cooking engineer. That together with our low rates for natural gas reduces our competition in this field to the barest minimum."

"Our real competition, in the immediate future, looks like it will be from the electric side, and the electric industry, along with the various utilities, has plans now for the manufacturing and distribution of more efficient electric commercial cooking and baking equipment. We can also expect, as soon as the free spending is over, real competition from oil; as the restaurant operator will look for, what appears to him, to be cheaper fuel. This, of course, will be oil.

"There is a bright side to this, however, in that it is a real challenge to the gas industry to get quickly under way a program, so designed, to reach our commercial users. This program should be focused towards convincing our commercial users that gas service is the cheapest and best of any services that they might use, in connection with their cooking operations. I believe that a concentrated program on both service and education will do this."

This is what *you* think your competition will be in 1951. The picture is not good. The trend seems to be to electricity for cooking. In the eastern part of the association, in manufactured gas territory, electric competition has arrived, and in addition to counter equipment, fryer and bake oven load, many electric ranges are being used. The all-electric commercial kitchen is increasingly noticeable, and the natural gas territories are forecasting that electricity will be their major threat by 1951.

This inroad of electricity must be stopped now. It is a problem of The Southern Gas Association and the American Gas Association, gas utility companies, and appliance manufacturers. As I see it, there are many things we can do. As manufacturers, we must continue research and continue to improve design, construction and performance; we must also promote and advertise; we must have trained aggressive sales personnel to assist in this job.

A.G.A. must continue and enhance their program of research, advertising and promotion. The good job they are doing now must go forward with ever increasing momentum.

You as utilities must continue a most aggressive sales program. This program must include advertising, floor displays, constant surveys and aggressive intelligent salesmanship.

"To be forewarned is to be forearmed." You can keep this commercial cooking load easier than you can get it back after it is lost. The time to start is now. Begin to make your surveys. Institute a regular monthly cleaning, inspection and repair service. Cooperate with hotel and restaurant equipment houses and let them know you want their assistance and do something to earn it. Tell your gas appliance manufacturers what you need for the job you have to do. Begin your promotional programs now. Meet this competition fairly and squarely and in 1951, the picture will not be as it is now projected because you will have done something about it.

Gas utility companies in promoting the sale of commercial equipment should avail themselves of the following activities:

Newspaper Advertising: This could be directed at the food service trade or could be aimed indirectly by talking to the consumer public. This "indirection" would describe and illustrate the latest installation by some local restaurant or hotel. This would accomplish a double purpose, namely, sell the consumer and the food service management because they both use gas appliances.

Floor Displays: There should be an excellent display of commercial equipment, a complete battery showing all the various items such as range, broiler, oven, frialator, etc. They should be connected to gas so that a live demonstration can be given. When the prospect warrants the expense, actual cooking and baking demonstrations should be given to convince the prospect of the efficiency of the operation. Evenly baked pies, roasts and rolls would go far to prove improvements in modern commercial equipment.

Window Displays: This would consist of a typical appliance and interesting photographs of outstanding installations in the town. Enlargements of eating places which enjoy local renown would cause the public to stop and examine them.

Wall Displays: Photographs of local commercial installations should be hung on the walls. Where wall space is not available a "Multiplex" display fixture could be used very well.

Wall Maps: Maps of the city with colored pins to denote commercial installations would do much to sell the prospect on the need for new equipment due to his competitors bringing their own establishments up to date.

Wall Charts: Accurate records should be kept at all times of relative gas consumption on new commercial equipment. Photostats of gas bills before and after installation should be displayed to indicate gas savings. Here, too, a Multiplex could be employed to advantage.

Testimonial: A collection of testimonial letters should be acquired. These would tie in to the foregoing wall charts, maps, and photographs.

Survey: A complete survey should be made of the food service market. The equipment should be tabulated, including condition, age, etc. Its inadequacy should be particularly noted. Increase of customers puts undue burden on equipment and creates customer dissatisfaction because of consequent poor service.

This survey should be used not only

TABLE I. SUMMARY OF SURVEY FROM QUESTIONNAIRE MAILED TO GAS UTILITIES

	Competitive Fuels			Range Fuels			Fryer Fuels			Counter Equipment Fuels			Bake Oven Fuels		
State	*1941*	*1946*	*1952*	*1st*	*2nd*	*3rd*	*1st.*	*2nd*	*3rd*	*1st*	*2nd*	*3rd*	*1st*	*2nd*	*3rd*
Alabama	O	E	E	G	E	O	E	G		E	G		G	E	O
Arkansas	O	O	O	G	O	E	G	E		E	G		G	E	—
Florida	O	O	E	G	O	E	E	G		E	G		G	O	E
Georgia	C	E	E	G	E	C	G	E		E	G		G	E	C
Louisiana	BUT	BUT	BUT	G	BUT	O	G	BUT		E	G		G	—	—
Miss.	E	E	E	G	E	C	G	E		E	G		G	E	—
N.C.	C	O	E	G	E	C	E	G		E	G		C	G	E
New Mexico	—	—	E	G	—	—	G	—		G	—		G	—	—
Oklahoma	E	E	E	G	E	—	G	E		G	E		G	E	—
S.C.	C	C	E	G	E	C	G	E		E	G		G	C	E
Tennessee	E	E	E	G	E	C	E	G		E	G		E	G	C
Texas	E	E	E	G	C	O	G	E		G	E		G	E	—
Virginia	C	E	E	G	—	—	G	E		E	G		G	E	—

NOTE: C—Coal E—Electricity G—Gas BUT—Butane Gas O—Oil.

to sell new equipment but to sell additional needed equipment such as bake ovens for having home-made pies and rolls.

Card Index: The survey should be carefully card-indexed by districts, etc. This index should be employed for intelligent solicitation. That is, tabbing the cards reveals when new equipment should be pressed, where calls should be made, etc.

Direct Mail: With an adequate survey and card-index, the utility is in a splendid position to employ this list of prospects for mailing pieces of sales literature. This could consist of pieces supplied by the manufacturer or simple mailings prepared by the utility's advertising department. Mere post-cards can be very effective if mailed frequently and followed up consistently.

Specialists: For successful commercial equipment merchandising, the utility should train specialists, salesmen who devote their entire time to this work. The manufacturers will be glad to join in such training.

Sales Kits: The commercial equipment salesmen should have adequate sales kits. They should consist of photographs of installations, records of gas saving, testimonial letters, price lists, catalogs, etc. The salesmen should be ready at all times to cover the subject completely and convincingly.

Compensation: Commercial equipment calls for the highest caliber of salesmanship. None but a very intelligent and resourceful person can hope to achieve success in this highly competitive and intricate field. Such exceptional salesmanship can only be obtained by adequate compensation. Sufficient income must be insured to attract the proper type of salesman.

Cooperation: Hotel and restaurant equipment houses should be part and parcel of this program. Let them know you want and need their assistance. Work with them. Help their salesmen on tough jobs. Conduct educational and specialized sales programs for them.

Appalachian Short Course To Meet In September

The Appalachian Gas Measurement Short Course will hold its annual meeting at Morgantown, W. Va., Sept. 9-11. This meeting has been held yearly, except during the war, since its organization in 1938. The sessions draw from about 15 states east of the Mississippi river and are sponsored by the School of Mines, University of West Virginia. G. R. Spindler of that school and H. J. Wagner, West Virginia Public Service Commission, were among the leaders who founded the school.

Recent graduating class at Omaha Metropolitan Utilities District Cooking School

Girl Scout Cooking School Has 15 Year Record

THE Metropolitan Utilities District of Omaha, Nebr., through its Home Service Department, has featured Girl Scout cooking classes for 15 years. Today the Scouts regard the course as one of the outstanding features of their training. This cooking school has gained national recognition, judging from letters received from all over the country.

The course has a strong appeal to the creative interest of the average Girl Scout. Mrs. Alta Weymuller, home service director, seems to know how to make cooking even more attractive than a Saturday morning hike in the country. The course is free to all accredited Girl Scouts. All material is furnished by Utilities District and averages 15c per Scout for each lesson in the course. The five week course for 24 Scouts, a full crew, would cost the District around $18.

The class, which meets from 8 to 10 A.M. each Saturday, is held in the company building in the "bungalow." The stage has a range, water heater, refrigerator, dishwashing machine and cupboards. There are four tables, each with working space for six girls. Recipes and materials are arranged on each table before the girls arrive.

Each group works on its cooking problem and is responsible for the results obtained at that table. Mrs. Weymuller wanders from table to table answering questions, and in case of a failure, she holds a post mortem for the benefit of the class. A victrolla and a number of popular records are provided for listening or group singing during the work.

The first three weeks the girls devote their time to the preparation of foods which can be served every day in the home. They are encouraged to practice all their recipes at home. At the end of the first lesson, Mrs. Weymuller asks the Scouts to bring her as home work the next Saturday, a schedule of three well balanced meals —breakfast, lunch and dinner—for the entire week. The mother often has a hand in these schedules, which enhances family interest.

The fourth week is devoted to visual instructions in nutrition. First, the girls see a very interesting 20 to 30-minute nutrition movie, prepared and furnished free of charge by the National Dairy Council. The class is divided into three discussion groups, and each selects a meal—one breakfast, one lunch, and one dinner. The Scouts choose from a number of mounted cards the food they prefer. These cards are slipped in racks until a complete visual meal is assembled. The class discusses each meal on the grounds of arrangement, balance, appetite appeal, and whether it is within the theoretical family budget set up for the average income group. These mounted cards can be secured without cost from the National Dairy Council.

The last week of the course is devoted to cake making and the proper preparation of ice cream for refrigerator freezing, which is entirely different and much less work than freezing ice cream by the hand freezer method.

The girls attend this last lesson in full Scout uniform. Graduation exercises take place at 10 A.M., a diploma and Girl Scout cook book are presented, and pictures are taken. Graduates of the Utilities' cooking school are qualified cooks, and the company regards the school as one of its outstanding good will builders.

A batter-out and jiggerman (left) feed newly formed ware into the black panel gas-fired radiant dryer just installed at Vernon, Calif.

Work emerges (at right) from the dryer where molds are stripped and placed on the return conveyor shown at the left.

NEW GAS-FIRED PRODUCTION LINE DRYER

Saves Time, Money, Labor, for Southern California Pottery Manufacturer

By RALPH MARTIN,
Plant Manager, Vernon Kilns, Vernon, California.

EXTENSIVE research on two continents has resulted in the development of a radically new type gas-fired black panel radiant dryer which enables ceramic ware to be dried on a production line basis.

With the aid of this new gas-fired radiant black panel dryer, the entire drying cycle is cut to approximately 15 to 20 minutes. Prior to the installation of this dryer, ware at Vernon Kilns was left in drying rooms for a period of between 4 to 10 hours. Preliminary figures show that these dryers have a capacity of approximately 65 to 80 dozen pieces of small ware per hour.

Production line methods have long been needed in the ceramic industry and the installation of this radically new type gas-fired dryer at Vernon Kilns is an important step in increasing the efficiency of the entire plant.

Initial research on the possibilities of radiant black panel drying using gas fuel was instigated in England, but was curtailed at the outbreak of the war. However, all the data compiled was forwarded to America.

William Clements, chief engineer of Automatic Control and Equipment Co., Glendale, Calif., suggested that the principle of radiant drying could be adapted to ceramic drying. The engineering department of Vernon decided the plan was feasible and an experimental dryer was made. Tests with this model were so encouraging that Vernon authorized the Automatic Control and Equipment Co. to build four full scale radiant dryers.

General Construction

At the present time, Vernon Kilns has the first of these new gas dryers installed and in operation. The dryer is compactly designed to conserve valuable plant floor space, its over-all dimensions being only 46 ft. long, by 6 ft., 5 in. wide, and approximately 8 ft., 8 in. high. Basically, this dryer consists of four main components:

1. Woven wire conveyor.
2. Black panel radiant drying section.
3. Convection drying section.
4. Mold return conveyor.

The Conveyor: The main conveyor is of a conventional design and is equipped with a 42-in. balanced weave wire conveyor belt. The conveyor belt is driven by an electric motor through a reduction gear and a variable drive unit which permits a variation in belt speed of from ¾ to 4 lineal ft. per minute.

Radiant Panel: The construction of the black panel radiant drying section used in the experimental unit, as well as the first dryer, was designed for the use of multiple burners located above the radiant panel in order to heat the panel uniformly, which in turn, gives off radiant heat to the wet clay, being carried within the molds.

The second dryer now being installed at Vernon Potteries is being equipped with a black panel radiant drying section, of a somewhat different design. Basically, the new units now being installed, utilize the re-circulated hot-air method for heating the radiant panel, heat being furnished through a single gas burner which can easily be equipped with full automatic control and safety equipment.

The temperature of the radiating panel can be set for any temperature and maintained by automatically controlling the amount of heat input to the re-circulated air. The re-circulation rate of air is such that a minimum temperature differential is obtained on the radiating panel.

The radiant drying black panel which we have mentioned above, is approximately 20 ft. long and 4 ft. wide, and is located at the loading

end of the conveyor. The height of the radiating panel above the conveyor belt is approximately 10 in. and since it is uniformly heated from end to end, as well as from side to side, a very uniform heat pattern is radiated downward to the wet clay on the molds, being carried on the belt beneath it.

The following tabulation gives an idea of the range of heat radiated from the black panel in Btu's per hour per square foot of panel:

Panel Temperature	*Radiated Heat Btu per Hr. Per Sq. Ft.*
300° F	400
400° F	750
500° F	1250
600° F	2000
700° F	2700
800° F	4000

This demonstrates that by controlling the panel temperature, a wide range of temperature from radiation is readily obtainable. The advantages of the controllability of such a system are many, since through the same dryer, different sizes, shapes and forms of ware may be run and at various speeds.

The reason for using the new method of heating the radiant panel over the multiple burner arrangement is that with a re-circulated hot-air system, the same fan can be used for cooling the panel and removing stored heat within the metal of the panel as well as the duct work of the heater box. Metal thicknesses are kept at a minimum in order to prevent the storage of large quantity of heat, thus making it possible to remove the stored heat within a few minutes.

In such a system where accelerated heat application is being applied to the wet clay, we endeavored primarily to put heat into the mass of wet material as it passes beneath the radiant heater. No attempt was made to circulate air in order to remove the moisture from the ware; this was accomplished within the convection drying section.

Convection Drying Section: The third component of this dryer is the convection air section, which uses a warm air fan for drawing air from the room, and mixes this with a controlled amount of hot air drawn from the dryers re-circulated air section. This warm air fan exhausts into a plenum chamber which is approximately 15 ft. long and extends over either side of the main conveyor belt. The warmed air from this plenum chamber is blown downward over the molds through a multiplicity of small openings properly located, in order to give the most desirable distribution of air flow.

Another air duct is located under the conveyor. Warm air which has become moisture laden after passing over the molds, is drawn into this duct by an exhaust fan. This fan exhausts the moisture laden air out of the building.

The temperature of the heated air which is passed over the ware, is approximately 125° to 140°. The temperature is automatically controlled.

Mold Return Conveyor: After the ware has passed through the warm convection air section, the molds are stripped and placed on the return conveyor where they are returned to the jiggerman. This return conveyor is driven from the same drive mechanism as the main conveyor, but at a higher speed in order to accommodate the number of molds being handled.

Collateral Advantages: Although the dryer was originally developed to cut drying time, other advantages immediately became apparent. By cutting down the drying time cycle, valuable plant space devoted to large drying rooms is saved. The saving in the number of molds needed for a particular item is also an important factor. It is estimated than from 25 to 30 dozen molds are required for high speed drying, whereas 150 to 200 dozen are required whenever slower drying time is necessary. This high-speed drying eliminates the need for large storage rooms for molds and saves on breakage due to handling. Any defects in the clay mixture itself are apparent in the first 15 to 20 minutes of operation.

Close-up of the exterior of radiant panel section showing the burner arrangement for the new, gas-fired ceramic dryer now in operation at Vernon Kilns.

Since this dryer uses gas, fuel costs are considerably less than they would be if other types of fuel were used and uniform temperatures are easily maintained throughout the entire drying cycle. Installation costs are comparable to other types of drying equipment and operating costs are less.

The new gas dryer now being installed at Vernon, is an "L" type unit and requires a floor space of approximately 30 sq. ft. The main difference in mechanical design of this "L" shaped unit is that we have substituted for the woven wire conveyor, trays which, when loaded with molds, are carried upward and then passed beneath the radiant black panel section by means of roller chain conveyors. After passing through the radiant heating section, they then pass between the plenum chambers of the convection air section, and as these trays are moving down after passing through the air convection section, provision is made so that the ware can be stripped and placed onto racks beneath the dryer unit or can be left on the trays and carried around to the same location where the loading operation was begun, where they will then be stripped and refilled before repeating the cycle.

This "L" shaped unit does not necessarily have to be constructed at the height shown, but can be lowered to any desirable height, depending upon

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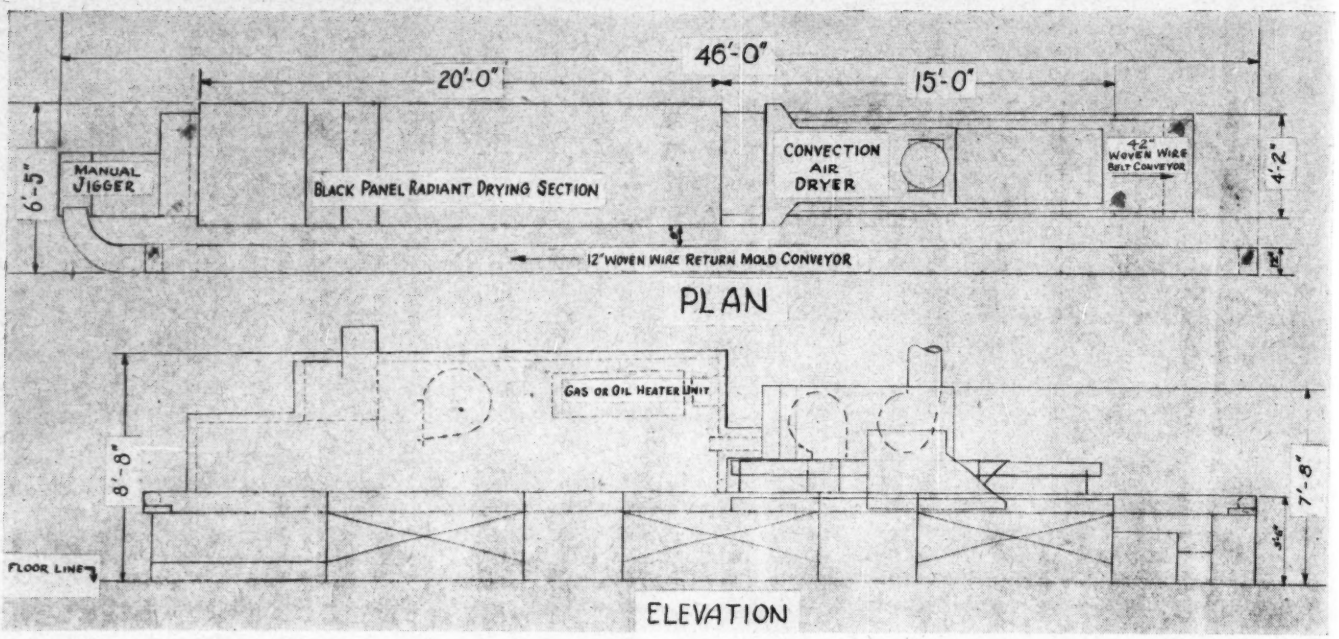
THIS FIRST PRACTICAL application of the gas-fired black panel radiant dryer in the Southern California area has resulted in considerable savings in time, money and labor for the Vernon Kilns. It was developed cooperatively by the Industrial Department of the Southern California Gas Co., The Automatic Control and Equipment Co., Glendale, Calif., and Vernon Kilns.

J. J. Svec, Technical Editor of "CERAMIC INDUSTRY" magazine, has said of this development: "After reading this article and analyzing the dryer, I can see that it is going to be an industry-shaking story. Here is a method of drying which is equal to that of electric infra-red and costing probably about one-tenth as much to operate. It will really open the eyes of every operator who reads the story."

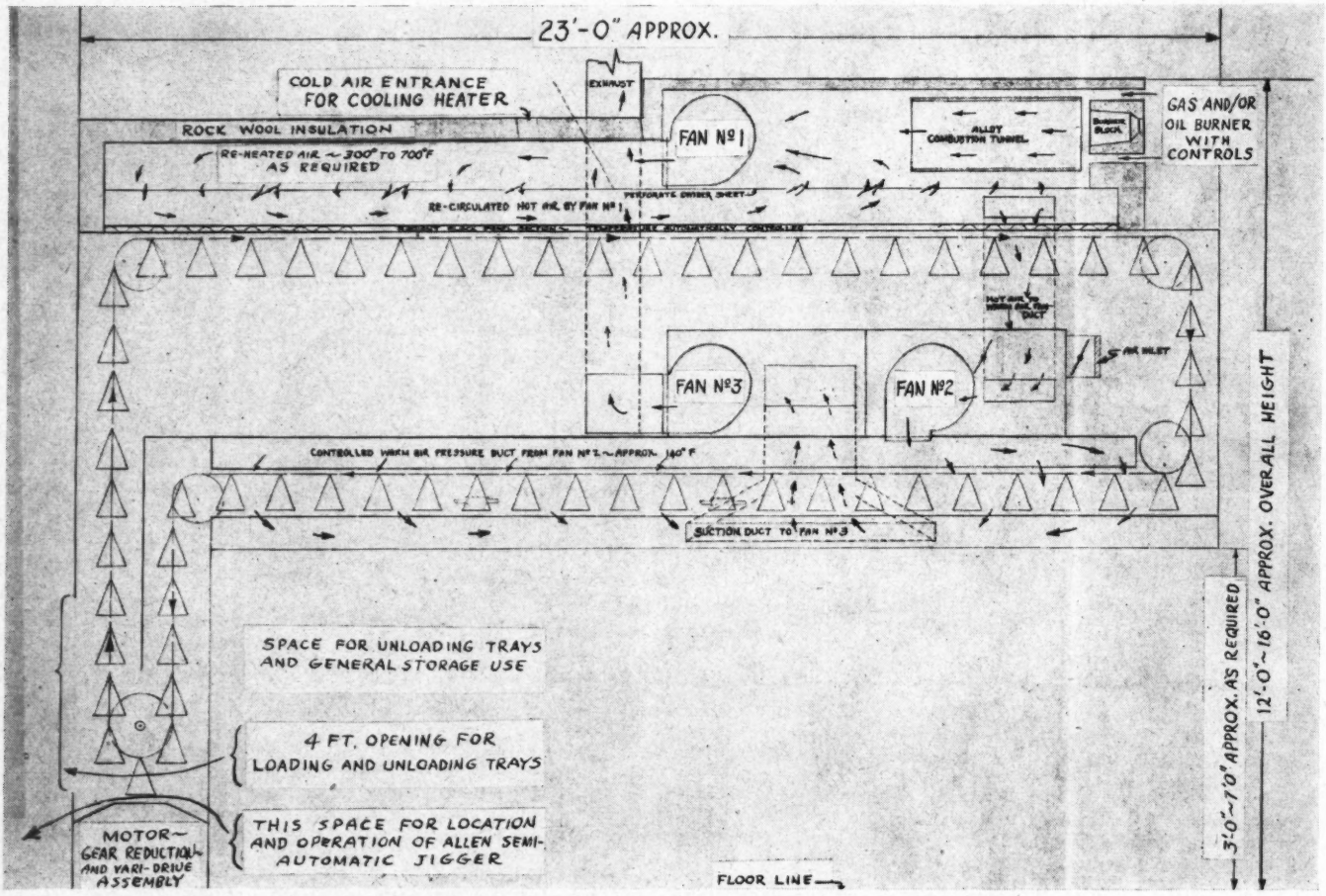
Most important advantage is that of speed with drying time cut from 4 to 10 hours to 15 to 20 minutes. As a result of this time saving, the potteries are not only able to increase production, but also to do so with lower mold investment, less space required for equipment, and with an opportunity to discover within a matter of minutes any defects in workmanship or in the pottery mix. The adoption of the production line technique permits the firm to lower its cost of operations, both over-all and specific, and to eliminate labor in carrying the jiggered material in and out of the drying ovens.

The general subject of radiant heating has been covered in previous issues of G A S. Particular reference might be made to the series of articles, "Radiant Heating for Industrial Processes" published in January, 1945 G A S, p. 22, and to "Infra-Red for Industrial Purposes," published in October 1943, p.47... While this article deals with radiant heating for drying ceramic ware, this type of drying equipment may be applied in the fields of paints, chemicals and plastics as well.

PRODUCTION LINE DRYER



Radiant panel dryer No. 2—sketch plant and elevation.


23'-0" APPROX.
COLD AIR ENTRANCE FOR COOLING HEATER
EXHAUST
ROCK WOOL INSULATION
RE-HEATED AIR ~ 300° TO 700°F AS REQUIRED
FAN Nº1
ALLEY COMBUSTION TUNNEL
GAS AND/OR OIL BURNER WITH CONTROLS
RE-CIRCULATED HOT AIR BY FAN Nº 1
PERFORATE SHEET
FAN Nº3
FAN Nº2
AIR INLET
CONTROLLED WARM AIR PRESSURE DUCT FROM FAN Nº 2 ~ APPROX. 140° F
SUCTION DUCT TO FAN Nº 3
SPACE FOR UNLOADING TRAYS AND GENERAL STORAGE USE
4 FT. OPENING FOR LOADING AND UNLOADING TRAYS
THIS SPACE FOR LOCATION AND OPERATION OF ALLEN SEMI-AUTOMATIC JIGGER
MOTOR-GEAR REDUCTION AND VARI-DRIVE ASSEMBLY
FLOOR LINE
3'0"~7'0" APPROX. AS REQUIRED
12'-0"~16'-0" APPROX. OVERALL HEIGHT

Radiant panel dryer No. 3—revised sectional view—general layout.

building construction or available floor space within any particular plant.

Semi-automatic jiggering machines will also be installed so that peak production efficiency of the new dryer can be maintained.

To summarize briefly, this new drying equipment has several unique advantages:

1. Production-line drying.
2. Saves plant floor space.
3. Cuts breakage due to handling.
4. Conserves storage space devoted to molds and drying rooms.
5. Cuts drying time cycle.
6. Number of molds needed is only one-sixth needed formerly.
7. Low operational cost.

The application of black panel radiant drying to other products is now being undertaken and favorable results have already been achieved in the drying of chemicals.

CODES AND STANDARD PRACTICES COVERING
GAS APPLIANCE INSTALLATION

By H. W. GEYER
Utilization Engineer, Southern Counties Gas Company.

THE installation of gas appliances is regulated in different communities through building codes, plumbing codes, gas codes, miscellaneous ordinances or gas company rules. In some cities the various gas appliances are regulated by different ordinances, enforced by different departments.

The Enabling Act in California and some other states permits adoption by cities of codes prepared in book form. The great saving in legal publication costs has made this procedure attractive, particularly to the smaller cities.

Groups of public officials have organized themselves into associations for the purpose of drafting so-called standard or uniform codes. Some of these organizations have standing committees for the purpose of preparing revisions in the light of technical developments. Such revisions are then incorporated periodically in new editions of the codes. Other groups also issue codes but do not have standing committees for periodic revisions.

The growth of this code standardization activity has brought to light the numerous discrepancies and conflicts in existing practices and regulations. Most of the older codes include arbitrary rule of thumb provisions. Current thought is directed toward revising such regulations by replacing them with results of research studies and tests. This brings about desirable standardization in dimensions, areas, spacings, and other technical factors. An added advantage is found in the simplification as well as standardization of job training procedures for installation and service men.

Trades Policy Standardization Needed

With the standardization of technical factors, there becomes more evident the lack of uniform rules on matters relating to trade practices and policies. I refer to the question of who may be permitted to install and service gas appliances.

Some codes confine their rules solely to technical regulation of appliances and their installation. No reference is made to licenses, permits, qualifications of installers, and similar administrative questions. Others, particularly the usual types of plumbing codes, refer only to installation and repair by licensed plumbers, omitting any reference to installation by gas appliance dealers.

A very few codes recognize the classification of gas fitter as an individual who installs, repairs, and services gas piping and gas appliances. As an example of a new development, the city of Los Angeles recently adopted an ordinance establishing the classifications of warm air heating contractor and journeyman warm air heating installer.

Other problems which have arisen in the past, and which will become more pressing in the near future, are those relating to the qualification and classification of men who service electrical controls on gas appliances, and those who install and service gas-fired air conditioning equipment. Since most of the present regulations do not provide for the latest technical developments in gas appliances, it may be theoretically necessary to qualify a gas company service man as a plumber, electrician, heating installer, and refrigerator repairman. Evidently, this situation needs further study and combined action by our industry if the installation and servicing of gas appliances are not to be weighted by burdensome handicaps.

H. W. Geyer

THE WHO, when and where of gas appliance installation has been, and is becoming progressively more, confused by a mass of ordinances, building codes, gas codes, and company rules, enforced and regulated by various bodies. Whether, for example, it may become necessary for a gas company serviceman to be qualified as a plumber, electrician, heating installer, and refrigerator repairman in order to perform his job, is one of the questions posed by the lack of uniformity in appliance installation codes. In this discussion, Mr. Geyer proposes that a joint effort be made by the operating and sales departments, together with public officials, to standardize codes and practices.

Mr. Geyer is a director of the Pacific Coast Gas Association and is chairman of the Approval Requirements Committee for Gas Water Heaters of the A.G.A. He is also a member of the Committee for Improvement of Gas Appliances, A.G.A., and is active in the Pacific Coast Building Officials' Conference and the Western Plumbing Officials Association. Educated at M.I.T., he received a degree in electrical engineering, and a master's degree in fuel and gas engineering. He has been with the Southern Counties Gas Co. of California since 1929, first as research engineer, later in his present position as gas utilization engineer. Mr. Geyer's remarks were presented before the Utilization Conference of the Pacific Coast Gas Association, Sacramento, Calif., April 24 and 25, 1946.

Current Problems

The latest and best known codes commonly in use on the West Coast are cited in the appendix. They should be consulted for detailed current provisions. Subjects which should be given most attention in the future are mentioned below because their regulation is apparently not well understood either within or outside of the gas industry.

Range Connectors: The adoption of very close fitting cabinet construction in kitchens brought about the introduction of flexible metal gas range connectors. These connectors have factory applied union connections at each end and are installed with a shut-off valve between the house piping and the connector. They are of bellows-type construction, the metal being brass, bronze, or steel. Without the use of such a flexible connector it is very difficult to make a safe gas-tight piping connection using only iron piping. Yet, few codes now provide for other than a solid pipe connection.

Flush-to-Wall Ranges: With respect to gas ranges, the introduction of flush-to-wall models requires an understanding of their correct installation. Spacing from walls and sides should conform to the type of range and the specifications of the A.G.A. Installation Requirements for Gas Appliances.

Kitchen Ventilation: The requirement of mandatory venting of the range oven should be re-examined. Studies of the ventilated gas kitchen will bring about changes in appliance installation, and the ventilation of

APPLIANCE INSTALLATION CODES NOW IN USE

1. *Uniform Building Code,* 1946 *Edition*
   Pacific Coast Building Officials Conference, 124 W. 4th St., Los Angeles 13, Calif.
   Chapter 37 of this code governs the construction of chimneys, fireplaces, and vents, as well as kitchen ventilation. Chapter 51 contains detailed requirements for the installation of heating appliances, their location, and a provision for adequate air supply. The code in its previous editions has been adopted by over 400 cities in 34 states and some foreign countries. No administrative provisions are made for licensing or qualification of dealers or other installers.
2. *Standard Gas Code,* 1938 *Edition*
   Pacific Coast Plumbing Officials Association (now Western Plumbing Officials Association) 4733 Templeton St., Los Angeles 32. This code contains detailed regulations governing the sale, installation, maintenance, and repair of all types of gas appliances and house gas piping. It also provides for the issuance of permits and the licensing of persons engaged in the business of installing, etc. gas appliances. Provision is made for the gas appliance dealer.
3. *Uniform Plumbing Code,* 1946 *Edition*
   Western Plumbing Officials' Association, 4733 Templeton St., Los Angeles 32. This is principally a plumbing code which contains one chapter (Chapter 15) dealing with gas fitting, gas water heaters, and gas water heater vents. All persons installing such equipment must be licensed.
4. *Building Code*
   Recommended by the National Board of Fire Underwriters, 1943 Edition, 85 John Street, N. Y. This building code contains provisions regulating heating appliances, heating, ventilating, air conditioning, as well as flues and vents for such appliances, and gas piping.
5. *A.G.A. Piping and Appliance Installation Requirements*
   These requirements, through adoption by gas companies, have practically the force of law in many eastern cities. They contain general requirements on house piping, on appliance installation, and are particularly detailed in their regulations on the installation of the various types of uninsulated, insulated, and flush-to-wall gas ranges. *American Gas Association Requirements and Recommended Practice for House Piping and Appliance Installation,* 1940 (first reprint January, 1945). American Gas Association, 420 Lexington Ave., N. Y. 17, N. Y.
6. *Municipal Code of the City of Los Angeles, California*
   In this municipal code are major sections which are commonly referred to as the "Plumbing Code" and "Heating Code." These ordinances contain the most advanced and detailed regulations dealing with the installation of water heaters, vents, heating appliances, flexible metal appliance connectors and the licensing of gas fitters as well as warm air heating installers. Some technical sections of the heating code are still in the process of being legally adopted in the form of an ordinance. According to present law and practice all regulations in this municipal code are reviewed once each year, and are brought up to date with technical developments and field experience. Copies of the Los Angeles Plumbing Code are obtainable from Western Plumbing and Heating Journal, 3665 So. Vermont Avenue, Los Angeles 7, California. Inquiries on the Heating Code should be sent to the Heating Division, Department of Building and Safety, City Hall, Los Angeles, Calif.

kitchens which require new techniques and regulations.

In West Coast areas, it is often customary to install the water heater in (or adjacent to) the kitchen. With the introduction of mechanical ventilation in a closed kitchen, a downdraft condition in the water heater vent might be created. This subject requires further study.

Venting of Gas Water Heaters: The gas water heater is a well standardized appliance. Yet, it is an open question whether the water heater vent should be interconnected with any other vent, say that of the furnace. Recent studies of the multiple venting of several water heaters show that the vent requirements of such an installation are apparently quite different from those of a multiple vent serving a number of gas furnaces.

Air Supply: One of the most neglected subjects is that of providing a permanent and adequate air supply for combustion and ventilation. This is particularly true of furnace installations. The source of combustion air should not be subject to accidental interruption or curtailment by the users of the furnace.

Neither should it be possible to adversely affect the flow of circulating air so as to bring about either a fire hazard or mixing with flue gas.

Accessibility: More attention should be directed to accessibility of appliances. Installation costs go up rapidly as appliances are built in to a greater degree. When the need for repairs or service adjustment arises, lack of accessibility causes unnecessary expense.

Ease of lighting pilots or adjustment of controls by the user should also be considered. Only the very latest codes contain provisions which discourage installations inaccessible for normal adjustments.

"Balanced" Viewpoint Recommended

Associations of public officials, in general, are quite receptive to suggestions for improvement in local codes. All requests for assistance should be most carefully considered and answered. In preparing drafts of suggested revisions or additions, a balanced view of the situation should be taken. Regulations should neither be unduly restrictive to the sale and installation of gas appliances nor should such essential matters as safety of construction, installation, and operation be neglected. This can be accomplished by consultations between operating and sales departments so that the viewpoint and responsibility of both groups will be represented.

Due weight should be given to the problems of gas appliance dealers and their position as an essential element of our industry. No provisions should be considered which would arbitrarily restrict the installation of appliances to any one trade or group. Any individual or firm which can qualify by complying with reasonable ordinance provisions should be granted the privilege of engaging in all phases of the gas appliance business.

All code or ordinance subjects which lend themselves to research and test should be regulated in accordance with test results. Where nationally recognized standards or rules exist, such references should be given due weight.

Close coordination should be maintained between gas company departments responsible for sales, operations and service. Developments in gas utilization research are numerous and proceeding rapidly. Marked changes will result in installation and servicing practices. Acquaintance with coming developments will permit advance planning, so that codes, practices and viewpoints will be in good agreement.

ANA Report Available On Cooperative Advertising

The Association of National Advertisers has completed an 80-page report, "Vertical Cooperative Advertising," containing a summary of the advantages and disadvantages of this merchandising tool. The report was prepared by the ANA cooperative advertising committee, of which Ralph Winslow, Koppers Co., Inc., is chairman.

Among the subjects discussed are growth and development of cooperative advertising, methods of determining the size of allowances, methods of payment, kinds of media used, government attitudes, legal aspects, and agency service and compensation.

"Vertical Cooperative Advertising" is available from the Association of National Advertisers, 285 Madison Ave., New York 17, at $7.50 per copy.

Exports by Panhandle to Canada Approved by FPC

Authorization has been granted by the Federal Power Commission to Panhandle Eastern Pipe Line Co., Kansas City, Mo., to export and sell to the Union Gas Co. of Canada, Ltd., of Chatham, Ontario, a maximum of 5500 MMcf of natural gas yearly, provided the needs of the United States are met, FPC has disclosed. Permission to construct and operate the necessary facilities in connection with the service was also granted.

The Commission's order was based on a reciprocity policy, as it revealed that in the past gas from Ontario had been exported to the United States for consumption in Detroit, Toledo, and Buffalo, thus depleting the reserves that would otherwise be available to Union Gas. It was judged that the present reserves of Panhandle Eastern were sufficient to allow export of the authorized amount without imperiling service to consumers in the United States.

According to the terms of the contract between Panhandle Eastern and Union, entered into Nov. 24, 1944, Panhandle Eastern proposes to sell and deliver to the Canadian company 5500 MMcf of gas yearly for a period of 20 years. Under the contract terms, no deliveries are to be made during December, January, February and March of any year. However, the authorization of the Commission also prohibits delivery of gas during the month of November.

Panhandle Eastern, under the Commission's orders, is authorized to construct facilities estimated to cost about $516,500 to be used in the transportation and sale of such gas.

Reduction in Gas Rates For Edmonton Proposed

Gas rates in Edmonton, Alberta, Canada, will be reduced during 1946, according to the annual report of Northwestern Utilities Ltd., released by President H. R. Milner of Edmonton.

Negotiations are currently under way between the company and the city to effect the cut, which will be the second reduction in six years in Edmonton. The last slash was instituted in September, 1940, at an annual cost to the company of $117,000.

Concurrently, an extensive development and expansion program is planned for the year. Pipes will be laid to five nearby cities and towns and five additional wells will be drilled in the Kinsella field. Expenditures for 1946 are estimated at $2.3 million.

Additional funds will be obtained from bond refinancing and the disposal of preferred and common shares. Steady expansion of the system's services is shown in the company's report, which lists a record total of 19,567 consumers and 8.5 billion cu. ft. dispensed during 1945.

New York Natural Asks Cabot Purchase Approval

The FPC began hearings May 20 in Washington, D.C., on an application of New York State Natural Gas Corp., New York City, for authority to acquire the properties of Godfrey L. Cabot, Inc. and Cabot Gas Corp., and to operate facilities to deliver gas to the Pavilion Natural Gas Co., Producers Gas Co., Southern Tier Gas Corp., Empire Gas and Fuel Co., Ltd. and Rochester Gas and Electric Corp. All of the companies, with the exception of Rochester Gas and Electric, have been wholesale natural gas customers of the Cabot companies.

For $800,000 in cash, New York State Natural has contracted to purchase all real estate, equipment and rights of the Cabot companies, with the exception of certain production properties. The purchase contract carries with it an obligation for New York State Natural to continue delivery of gas at wholesale to former customers of the Cabot companies.

Acquisition of the Cabot properties will enable New York State Natural to coordinate its operations with its present pipe line and storage facilities, thus rendering better and more economical service to distributing companies and ultimate consumers.

New Firm Organized To Assist In Changeovers

Conversions and Surveys, Inc., is a new company which has been organized to assist gas utilities which are contemplating a changeover from manufactured to natural or liquefied petroleum gas. Principal offices are located at 90 Broad St., New York City.

John H. Warden, president and director, was associated with Oklahoma Natural Gas Co. and has been active for many years in the A.G.A. and the Southern Gas Association. Other officers are R. E. Ritchie, vice president and director; R. W. Ducker, vice president and director; G. L. Baker, treasurer; K. R. Teele, assistant treasurer; D. W. Judy, secretary; and W. C. MacInnes, P. J. Rempe, P. R. Taylor and H. W. Schell, directors.

M. C. Adams will be in charge of the actual changeover work, and Frank M. Orelup is directing the technical activities of the new company.

Laclede Plans Conversion To Natural Gas By 1947

Laclede Gas Co., St. Louis, Mo., will serve its customers straight natural gas as soon as facilities are available, the company announced recently. The probable date, which hangs upon completion of pipe lines, conversion of burners, and other change over jobs, is sometime during the fall of 1947.

The decision to make the conversion effective was reached when it was determined that a sufficient supply and reduction in rates could be assured. The rate reduction was met last November when the Federal Power Commission ordered an approximate 7% reduction in the price paid by Laclede for the natural gas it buys.

Pipe line facilities will be supplied by the Mississippi River Fuel Corp., which has scheduled construction of new lines. Date when the work can be started on this portion of the project is problematical, depending upon Mississippi Fuel's ability to obtain the needed materials.

Under the plan, 1,756,000 gas burners will have to be converted, a job which will require the training of at least 600 mechanics and an outlay of $2 million.

In spite of the program, Laclede plans to continue its byproduct coke oven plant in operation so long as there is a demand, and for as long a time as it is economically advantageous.

Joint Conference Held In New York June 3-5

The first major postwar A.G.A. Joint Production and Chemical Committee conference was held at Hotel Pennsylvania in New York, June 3-5. Dr. C. W. Wilson, Consolidated Gas Electric Light and Power Co. of Baltimore, chairman of the chemical committee, presided at the first morning session. Scheduled speakers included E. J. Boothby, A.G.A. president, and H. Carl Wolf, A.G.A. managing director. Enriching oils, coal production, water gas set capacity and tar dehydration were the subjects of other papers presented.

R. VanVliet, New York and Richmond Gas Co., chairman of the gas production committee, conducted a symposium on liquefied petroleum gases. Capt. E. S. Pettyjohn, director of the Institute of Gas Technology, outlined European gasification processes, and Dr. A. W. Gauger of Pennsylvania State College presented a paper on resins.

At the second day's session Hudson W. Reed, A.G.A. vice president and chairman of the manufactured gas department, presided. W. R. Fraser, Michigan Consolidated Gas Co., described the association's mixed gas research program, and P. T. Dashiell, Philadelphia Gas Works Co., reported on gas production research. Other papers covered the topics of organic sulfur, flash pulverization, reforming and catalysts.

Carbonization and coke, chemistry in the gas industry, high Btu gas, and water gas operation were the subjects of four off-the-record luncheon conferences held on June 4. The final morning session featured the showing of a sound slide film, followed by papers on blending properties of volatile coals and underground structure corrosion.

Rochester Gas & Electric Opens New Kitchen Center

The Rochester Gas & Electric Corp., Rochester, N.Y., has opened a show room housing three different types of kitchens and a laundry, embodying the latest developments in kitchen equipment with variety in arrangement, appliances, cabinets, snack bars, kiddie corners, and other features. Consideration was given to such factors as number of persons in the family, whether they will eat and entertain in the kitchen, and whether play space is needed for children.

All the kitchens are equipped with the "Rochester Plan" system of ventilation, developed by RG&E engineers and laboratory experts. The oven and broiler connect directly with a concealed duct in back of the range while a grill set in the wall above the range takes care of top burner cooking. Oily vapors and odors arising from cooking are caught at the source and whisked outside. The system can be regulated by fingertip control.

Alabama Gas Co. Granted Approval of Application

The Alabama Public Service Commission recently announced approval of Alabama Gas Co.'s application to construct, maintain and operate a gas utility in Prattville, Ala., and adjacent territory. Authority granted by the approval is to be exercised within one year.

ASSOCIATIONS

Report from Cincinnati

AT ITS first full-scale post-war convention, the Natural Gas Department of the American Gas Association attracted nearly 500 members of the industry to its annual May meeting held this year in Cincinnati, Ohio, with Walter C. Beckjord and his Cincinnati Gas and Electric Co. playing the role of industry host.

The advertising, publicity and general promotion programs that have been launched within the past two years bulked large in the papers read by the 15 scheduled speakers who addressed the two general sessions.

Opening the first session, R. H. Hargrove, of Shreveport, La., chairman of the Natural Gas Department, touched on the responsibility of individual management to reflect credit on an industry which has risen to such a dominant position in the past decade. The significance of natural gas was illustrated by the chairman's own figures showing that 44 million people in 33 states are now supplied natural gas through a network of 218,000 miles of pipe lines and mains. Total production is presently 3½ trillion cu. ft. and the market value of the product is $750 million annually. Natural gas has advanced from 38% to 48% in the proportion of customers served by the whole gas industry, and a recent statistical analysis of 116 natural gas companies shows their total assets to be over $3 billion.

The Real Job

The real job that faces the gas industry, in the opinion of E. J. Boothby, Washington, D.C., A.G.A. President, is that of "getting its share of the customer's dollar and rendering an ever increasing service for that dollar." Many ramifications develop as this project, which is common to all industries, is pursued. President Boothby foresees all industries headed for further restrictions and regulations with the natural gas industry presently being singled out as a particular field for the extension of federal power.

The keynote, in his opinion, is to meet challenges of this kind aggressively and with unified planning and action. He warned, however, that resistance to undue encroachment on the rights of the industry must be accompanied by renewed recognition on the part of the industry of its responsibilities: "Withdrawals of natural gas must be on an orderly, well coordinated and economic basis, with due regard to the public, both producing and consuming. Exploitation for purely private gain must be discouraged."

More specific and detailed comment on the subject of regulations was contained in a paper on recent court and commission decisions by William A. Dougherty, New York utility counsel. Reviewing eight years of regulation under the Natural Gas Act, he pointed out that the Federal Power Commission has succeeded in: establishing the end result doctrine and diminishing rate basis in fixing natural gas utility returns as a result of the Hope case; putting natural gas production by pipe line companies under regulatory control in the Canadian River-Colorado Interstate case; reducing the generally accepted rate of return from 6½% to 6%, first in the Mississippi River Fuel case and subsequently in several others. Commenting on the necessity for unhampered direct sales from natural gas pipe lines as an economic concomitant to their successful operation, Dougherty referred to applications denied in the Northern Natural Gas Co.'s Boone (Iowa) case and Panhandle Eastern Pipe Line Co.'s Ford Motor Co. service case, both of which decisions, despite the disclaimers of the commission, are patently designed to restrict end use of the fuel.

The status of the FPC Docket G-580, investigation of the natural gas industry, was brought up-to-date by E. Buddrus, Chicago, chairman of the Industry Committee, and by E. Holley Poe, New York, whom the committee has retained as its consultant during the investigation. Chairman Buddrus observed that "for the first time since the passage of the Natural Gas Act in 1938, the industry as a whole is attempting to present the major problems affecting it." He expressed the opinion that, despite the unfavorable aspect of increasing regulation, the investigation as a whole will result in further unification of the industry for the betterment of service to present and future consumers of natural gas. He invited suggestions from the industry at large concerning the presentation of any points of testimony that might be judged pertinent to the investigation.

Holley Poe, who has the responsibility for the actual compilation, editing and presentation of the industry's case, which will be delivered before the FPC hearings starting June 17 in Washington, stressed particularly the activity of the coal industry in attempting to obstruct the progress of natural gas. Accusing the FPC in its administration of the Natural Gas Act of having gone far beyond what was the intent of Congress, Poe said: "I conclude that if the letter and spirit of the Natural Gas Act need further spelling out, the act should be amended by Congress and not by the Federal Power Commission. It should be amended to prevent any alterations in the intent and concept of the Congress, through indirection, by its administrators."

Report on Reserves

Since the question of gas reserves has been considerably in the forefront of all discussions having to do with the need for additional federal regulation of the industry, the progress report by Lyon F. Terry, New York, on the work of the Natural Gas Reserves Committee of the A.G.A. was received with close attention. The project of evaluating and maintaining a continuing record of gas reserves was initiated in October 1945, and the first nationwide estimate of gas reserves will be completed, according to Terry, in time for presentation before the annual convention of the A.G.A. in October. All of the reserve studies are being made in close cooperation with an American Petroleum Institute committee which is charged with a similar evaluation of the liquid hydrocarbon products in association with oil.

In the field of labor problems, Fred Rauch, Cincinnati, delineated the trends in industrial relations as they affect the gas industry. With over 14 million American workers now enrolled as labor union members, the employees' position in respect to management has been immensely strengthened and the general political position of labor has been correspondingly enhanced. Rauch believes that the growth of unionism cannot be attributed entirely to the Wagner Act and similar legislative measures, but must be traced back to past failures on the part of employers to recognize voluntarily the fundamental rights of their employees. Further organization of utili-

INDUSTRY LEADERS

At the

NATURAL GAS CONVENTION

May 7-8, Cincinnati

R. H. Hargrove, vice president, United Gas Pipe Line Co., Shreveport; and D. A. Hulcy, president, Lone Star Gas Co., Dallas.

William A. Dougherty, general counsel, Consolidated Natural Gas Co., New York; and J. French Robinson, president, The East Ohio Gas Co., Cleveland.

E. Buddrus, president, Panhandle Eastern Pipe Line Co., Chicago; and E. Holley Poe, natural gas consultant, E. Holley Poe and Associates, New York.

Edward M. Borger, president, People's Natural Gas Co., Pittsburgh; and Robert W. Hendee, president, Colorado Interstate Gas Co., Denver.

Walter C. Beckjord, president, Cincinnati Gas and Electric Co., Cincinnati; and Harry D. Hancock, president, Gas Advisers, Inc., New York.

BELOW: Kenneth Eilerts, U. S. Bureau of Mines, Bartlesville, Okla.; L. T. Potter, superintendent of production, Lone Star Gas Co., Dallas; J. H. Isherwood, vice president and general manager, North Penn Gas Co., Port Allegany, Pa.; Marian L. Fort, superintendent of operations, Pacific Lighting Corp., Los Angeles.

ties are included in both CIO and AFL programs with the unionization of foremen gaining momentum.

Wagner Act Revision Sought

Needed relief from the irresponsibility of union manipulations to the detriment of the public can be obtained, in the speaker's opinion, only through a program which will include 1) revising the Wagner Act so that it may be fair to both employer and employee and, 2) rescinding labor unions immunities to prosecution under existing laws. In the meantime, however, and until such needed changes are made, he believes that the greatest good can be accomplished by every employer putting his own labor relations in the best possible order.

The aims and activities of a revitalized American Gas Association were presented by its managing director, H. Carl Wolf, New York, and by D. A. Hulcy, Dallas, who spoke on the industry's promotion program. Gas industry promotion will, in time, reach the housewife through the medium of home planning bureaus and the New Freedom gas kitchen; architects will be supplied with a modern reference manual for their use in designing homes and other structures; special manuals are to be written for the use of gas utility home service departments featuring the kind and use of automatic gas ranges; an educational program on gas house heating is being projected; and other literature in preparation will feature gas refrigeration, automatic gas water heaters, and appliances and equipment designed for commercial and industrial gas consumers. The organization of a speakers' bureau, and the filming of a motion picture for free display before groups and service organizations are two other major projects.

Papers of a technical nature were presented in the general sessions and in the parallel sessions of the Transmission Committee, Production and Storage Committee and the Accounting Committee of the A.G.A. Harry D. Hancock of New York reported on the progress of the natural gas department research program. A brief, overall description of the uses of natural gas in Germany was given by E. S. Pettyjohn, Chicago, the information having been gathered at first hand as a result of his tour of inspection of Europe under U.S. Navy auspices.

P. C. Keith described a new plant now being installed at Brownsville, Texas, for the manufacture of diesel oil, gasoline and alcohol from natural gas. This will be the first synthetic gasoline plant in the country and it is Keith's opinion that the gasoline product will be able to compete with that made from crude oil at $2 a barrel. The new development, if successful, should result in an increase in the price of gas at the well head to 10 cents per Mcf. Gasoline thus produced is expected to cost no more than 5¼ cents including capital charges.

Cheap Manufactured Gas Forecast

Digressing briefly into the field of the gasification of coal, the speaker predicted that within a few years it will be possible to make 1000 Btu gas from coal in the New York area at a delivered price cheaper than that which would be possible by bringing 5-cent gas from Texas through high-pressure transmission lines.

New developments in gas turbines were described by J. Kenneth Salisbury, Schenectady (N.Y.) engineer, who has done extended research in this field under the auspices of the General Electric Co.

The current new developments in the use of propane as an auxiliary and peak load gas supply by large utilities in the manufactured gas area were described by Francis E. Drake of New York. His company, the Pacific Gas Corp., has just completed a big peak load and standby installation for the New York Consolidated Edison Co. and is engineering a similar installation for the Brooklyn Union Gas Co. which is expected to be in operation before the winter heating season.

Meetings of the Transmission Committee were under the chairmanship of H. J. Carson, from Omaha, Nebr., and papers presented included: "Gas Hydrate Composition and Equilibrium Data," by W. M. Deaton, Amarillo (Texas) helium engineer, employed by the Bureau of Mines; "Solid Adsorption-Type Natural Gas Dehydration Plants," by Carl V. Spangler, Pittsburgh, Pa.; "Field Compressing Stations," by C. S. Worley, Oklahoma City, Okla.; and "Radio Systems for Pipe Lines," by Warren T. Bulla, Chicago, Ill. The Production and Storage Committee, under the chairmanship of L .T. Potter, Dallas, Texas, considered papers presented on "'Windowed Cell for Observing Hycrocarbon Phases Under Variable Pressures," by Kenneth Eilerts, Bartlesville, Okla., Bureau of Mines chemist; "Corrosion of Equipment in High Pressure Gas Wells," by T. S. Bacon, Dallas, Texas; "Underground Storage in the Goleta, (Calif.) Project," by Marion L. Fort, Los Angeles, and "Storage in the Appalachian Area," by J. H. Isherwood, Port Allegany, Pa.

The one session of the Accounting Committee was presided over by Leith V. Watkins and devoted itself to round-table discussions on problems of depletion accounting, taxes, allocation of various geophysical and exploratory costs, billing of customers and uniform classification of accounts.

The Monday preceding the Natural Gas Convention was devoted to the annual executive conference of the Advisory Council and Executive Board of the entire A.G.A. Off-the-record discussions of managerial problems and the relationship between the gas utility industry and manufacturers of appliances and equipment occupied the attention of top-flight executives invited to participate.

CALENDAR

June

American Gas Association Joint Production and Chemical Committee Conference — Hotel Pennsylvania, New York City, June 3-5.

National Fire Protection Association—Boston, June 3-6.

American Gas Association Southwest Conference—Blackstone Hotel, Fort Worth, Texas, June 4.

American Gas Association Midwest Personnel Conference—Phillips Hotel, Kansas City, June 6.

Public Utilities Advertising Association—Atlantic City, N. J., June 10-11.

Gas Appliance Manufacturers Association Annual Meeting — Drake Hotel, Chicago, June 11-12.

Federal Power Commission's Natural Gas Investigation—Washington, D.C., June 17.

Canadian Gas Association, 39th Annual Convention—Mannoir Richelieu Hotel, Murray Bay, Quebec, June 18-21.

American Home Economics Association—Public Auditorium, Cleveland, Ohio, June 24-28.

September

Sixth Annual Appalachian Gas Measurement Short Course—West Virginia University, Morgantown, W. Va., Sept. 9-11.

Pacific Coast Gas Association Convention—Fairmont Hotel, San Francisco, Sept. 10-12.

October

American Gas Association Annual Convention and Exhibit—Atlantic City, N. J., Oct. 7-11.

November

National Hotel Exposition — Grand Central Palace, New York City, Nov. 11-15.

National Metal Congress and Exposition—Atlantic City, Nov. 18-22.

Indiana Gas Association Elects New Officers

Officers elected at the 36th annual convention of the Indiana Gas Association, May 9-10, French Lick, Ind., were: President, E. D. Anderson, vice president, Northern Indiana Public Service Co.; vice president, Dean T. Burns, assistant manager, Citizens Gas & Coke Utility; secretary-treasurer, Clarence W. Goris, division manager, Northern Indiana Public Service Co.

E. D. Anderson

"Trends in Utility Regulation" was a paper presented by Leroy E. Yoder, chairman, Public Service Commission of Indiana, and Walter C. Beckjord, president, Cincinnati Gas & Electric Co., discussed "Challenges to the Gas Industry". "Automatically Yours" was the topic of an address by E. Carl Sorby, vice president, George D. Roper Corp. Dr. Louis M. Sears, professor of history, Purdue university, spoke on "The Old Diplomacy and the New Bomb" at the banquet session.

Joint Conference Studies Domestic Gas Research

What's doing in the field of domestic gas research was unfolded before 130 delegates to the West Coast Technical Conference on Domestic Gas Research, jointly sponsored by the Committee on Domestic Gas Research of the American Gas Association and the Manufacturers and Sales Section of the Pacific Coast Gas Association, and held in Los Angeles, May 16 and 17.

Cooking, gas burners, water heating, house heating, and space heating were the subjects of panel and general discussions at the meeting.

General sessions were presided over by F. M. Banks, chairman of the A.G.A. committee which co-sponsored the conference, and Eugene D. Milener, A.G.A. coordinator of general research. Milener also spoke at the Thursday luncheon session, in an address keynoting the present and future in the field of research.

Speakers at the Friday luncheon session included Newton S. Leichter, engineering stylist, who spoke on "The Importance of Research in Appliance Appearance," and C. E. Blome, Purdue Research Foundation, Housing Division, Lafayette, Ind., whose subject was "Problems in Connection with Vapor Condensation in Homes." Both addresses were illustrated with slides.

Pennsylvania Gas Assn. Holds 38th Annual Meeting

The 38th annual meeting of the Pennsylvania Gas Association was held May 21-23 at Galen Hall, Wernersville, Pa. Hudson W. Reed, president of The Philadelphia Gas Works Co. and vice president of the A.G.A., gave the opening address, "Competition—An Aid to Progress". Various sessions of the conference were devoted to distribution, accounting, production, employee and industrial relations, and new business. Speakers at the final session of the meeting were J. G. Bennett, design and test engineer, Caloric Gas Stove Works, who discussed "Single Point Ignition of Broiler and Bake Oven", and Lyle C. Harvey, president, Bryant Heater Co., whose topic was "The Challenge to Gas".

Record Number of Delegates Attends Norman Gas Measurement Short Course

Problems growing out of peacetime regulation and measurement of gas occupied the attention of 783 executives and employees from 27 states, as well as from Canada and Russia, at the 21st Southwestern Gas Measurement Short Course at Norman, Okla., April 23-25.

Attendance broke all previous records and taxed almost to the limit the facilities of the College of Engineering, University of Oklahoma, which sponsored the course.

"Gas Business Measurements," a paper delivered at the opening session by S. B. Irelan, of Oklahoma City, president of the Cities Service Gas Co., featured the meeting. That "Congress intended the use of all the specific standards adopted by the Federal Power Commission and the inclusion of the natural gas business in the same category for regulation as a public utility" is a principle of which he expressed himself as doubtful.

Irelan also berated the commission's rigid doctrine of accounting, whereby the rate base was predicated upon depreciated original costs of facilities, with the result that the original rate will diminish each year by the amount of the annual accrued depreciation. Further hampering of the industry was seen in the indications that the price of natural gas produced by companies that do not transport it in interstate commerce may be subject to commission regulation.

This year the banquet and entertainment features of former years were bypassed and the full time was devoted to general sessions in the forenoons and classes for instruction and demonstrations in the afternoons. More than 50 classes were conducted covering a wide variety of technical subjects relating to natural gas, casinghead gas, gasoline and oil measurement, regulation and transmission.

Four members of a delegation of 11 Russian engineers now in the United States, visited the short course, studied the exhibits of new and improved gas measurement and regulating equipment. They were N. Podkopaev and V. I. Gorodetsky, both of New York City, and Frank Sykora and V. Bichkow, both of Washington, D. C. All are members of the government purchasing commission of the Soviet Union and were sent from Moscow a few weeks ago to study and to purchase or recommend purchase of equipment.

The new chairman of the general committee to conduct the 1947 short course is R. M. Scofield, field superintendent of gas measurement for the Lone Star Gas Co., Dallas, Texas. The appointment was announced by the executive committee. He succeeds C. A. Gibson, Cities Service Gas Co., Bartlesville, Okla. Scofield was chairman of the program committee for this year's course and has served on the general committee in various capacities for the past nine years.

Following five years of study the committee for study of practical methods submitted its report entitled "Safety Practices for Gas Measurement and Regulation". The report covers general safety practices, testing positive displacement meters, testing orifice meters, inspecting regulators, and inspections. Dean W. H. Carson of the college of engineering had the report printed and announced that it is available through his office for 15 cents.

Joint Conference Planned By A.G.A. Personnel Group

Plans for a joint meeting with the A.G.A. Midwest Personnel Conference to discuss techniques of contract negotiation were begun at the April 12 meeting of the A.G.A. Southwest Personnel Conference, held in Houston, Texas. V. H. Luneborg of the Arkansas Natural Gas Corp. and H. F. Taylor of the Oklahoma Natural Gas Corp. were appointed as a committee to promote the meeting. Latest developments in industrial relations were outlined at the session.

PCGA Making Plans For Fall Convention

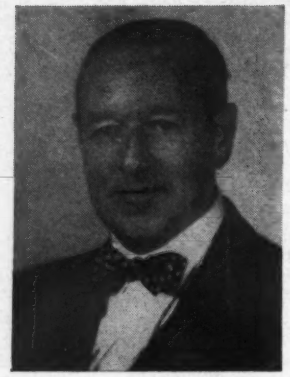
President H. W. Edmund has announced that the Pacific Coast Gas Association will hold a convention at the Fairmont Hotel in San Francisco, Sept. 10, 11 and 12. Edmund will act as chairman of the program committee, assisted by section chairmen J. W. Vanier (accounting), E. T. Howard (manufacturers), R. L. Hayden (sales), D. E. Farmer (technical) and W. R. Davis (personnel).

Inflation Hedges Discussed At Joint Accounting Meet

The effect of the government's fiscal policy and the prospect of inflation as it affects public utilities economics were the keynote subjects discussed at the annual spring conference of gas and electric company accountants, held April 1-3 in Cincinnati. The joint meeting was sponsored by the American Gas Association and the Edison Electric Institute, and attracted 600 delegates.

Denouncing a fiscal policy which he described as treating government debt "as prosperity and thrift as an anti-social act," Dr. Walter E. Spahr, professor of economics, New York University, suggested as remedies an overall fiscal plan, better organization and staffing of congressional appropriations committees, discontinuance of indefinite appropriations, balancing of the federal budget, and a return to the gold standard, among other measures.

Professor Harry G. Guthmann, of the School of Commerce, Northwestern University, supplemented Dr. Spahr's talk with an address touching on the effects of inflation on gas and electric company finances. With further rises in price levels forecast, he urged preparation throughout the industries for such eventualities; such preparations to include possible rate increases and studies of budgetary requirements.



PROMOTIONAL NOTES and NOTIONS

By STANLEY JENKS

Mexican Cooking Costs

Looking through my notes on the Mexican trip, which I sketchily covered in the March issue, I came across some comparative average cooking costs, given me by the executive vice president of a Mexican electric utility.

Electricity	—22 pesos* monthly (using 200 kwh)
Wood	—15-18 pesos monthly
B-P Gas	—13-15 pesos monthly

*Present exchange is 4.85 pesos to the U.S. dollar.

The B-P gas (mostly butane), despite the government-owned oil monopoly, is mostly imported from the United States.

Tougher Going

Any student of 1945 industrial and utility annual reports has seen ample evidence of what can happen to any business operating on a contractual basis like ours, under the rules and regulations of official stumblebumbledom in Washington.

The gas industry is mighty proud, and justly so, of its wartime contribution to victory. Both major branches, natural and manufactured, performed service miracles meeting the demand. They did it—and how! But—

Well! Let's take a look at what is actually happening. The Providence Gas Co., in the heart of industrial New England, is a mighty good manufactured gas operating company. It is well managed, and I believe better than average among companies of its size. Yet, with the highest send-out in its history in 1945, it had to tap its surplus for $61,162 to maintain its annual capital stock dividend of 50 cents a share. Increases in operating expenses, such as coal costs, labor, etc., amounted to $387,454 more than wiped out the increased revenues, leaving the net operating income $298,222 less than in 1944.

Fortunately, tax carrybacks against excess profits tax may take up most of the amount lifted from surplus, but the fact still remains that a soundly operated utility, its own prices rigidly controlled, and doing a record-breaking volume of business, was forced to operate at a loss because bureaucracy failed to hold that line of bolony it spouts so glibly.

Rate relief is one answer. A better solution is to take the OPA brakes off industrial production (1) to bring down prices and (2) to create the necessary spending power on which every public utility inevitably depends for the successful sale of its services.

Appliance Simplification

The question of simplifying gas appliance production is not a new one on this page. The appliance manufacturers, anxious to please utility tastes, have been at times driven into all kinds of expensive production tangles by the finickiness of utility utilization engineers.

There is one thing I am praying for—and very seriously, too—and this the simplification of the domestic automatic hot water heater situation.

I doubt if any gas appliance has been subjected to so much unadulterated, so-called technical, balderdash. Ponderous professors, aided and abetted by utility engineers, have drawn more curves than you can see in a whole season at Atlantic City. Draw-off tests, burner capacities, thermal efficiencies, recovery rates are splattered all over the lot. To prove what? Much of it reminds me of the hair specialist on a recent "Amos and Andy" program, who, after some elaborate tests with a machine, advised the Kingfish that he was bald.

"I know that already," protested the Kingfish. "Why use a machine to tell me that?"'

"Well!" said the doctor, "I've $3000 invested in that machine, and I've got to justify having it."

For more years than I like to think about, I have been studying automatic water heating curves and charts. The personal interest of a pioneer in the field, if you please. The only logical conclusion at which I can arrive is that the permutations and combinations of Btu inputs, tank sizes, special baffles, flueways, and what-not unnecessarily complicate the sales situation. Especially when they are projected into the selling picture in the form of bewildering claims and counterclaims—then it becomes ridiculous. Striving for the last percentage of efficiency is admirable from a technical viewpoint, but let's be reasonable. The manufacturer wants to mass produce his units, not build them as special jobs.

As a customer, I claim the whole domestic water heating field can be covered to the public's entire satisfaction by two or three, at the most, sizes of heaters. The resultant lower sales price, by making mass production possible, would more than offset the one or two per cent efficiency that may be sacrificed.

The whole thing is a relic of the days when we ourselves were scared of the costs of automatic water heating, thus setting up a delicious piece of cake for our utilization men, who are still being allowed to enjoy it. Manufacturers and sales departments are taking the rap.

NEW HOT WATER FREEDOM

Sparkling Clean Hot Water

"Packaged in Glass"

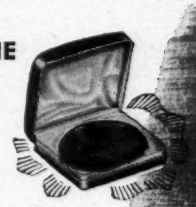
—In PERMAGLAS *the sparkling blue, mirror-smooth glass-fused-to-steel!*

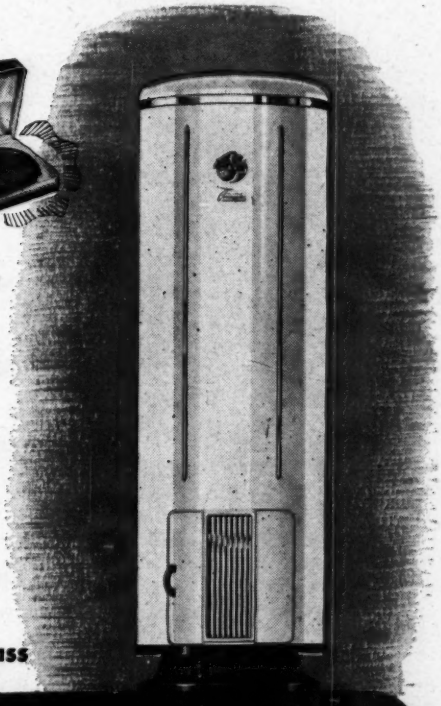
SMITHway *Permaglas* Water Heaters heat and store water in a "glass package" that CANNOT rust or corrode . . . the glass lining proved in 23.000 test-years with waters from every state in the Union.

It's the truly *modern* hot-water convenience designed to match the comfort and efficiency of today's most modern homes —hot water as sparkling clean as its source!

Get all the facts on hot water "packaged in glass." Send today for "The Inside Story of Permaglas" to the A. O. Smith office nearest you.

There's Only ONE *PERMAGLAS*





SMITHway Permaglas GLASS-FUSED-TO-STEEL

. . . A Great Aid to Sales

SMITHway PERMAGLAS *Water Heaters give you the most powerful* new *sales story in the gas-appliance business . . .*

The monoquad, glass-lined heater tank. Sanitary as a sparkling drinking glass.

No tank-corrosion in the bath . . . no "tank-spots" on clean laundry.

Sparkling clean hot water as pure as the source itself.

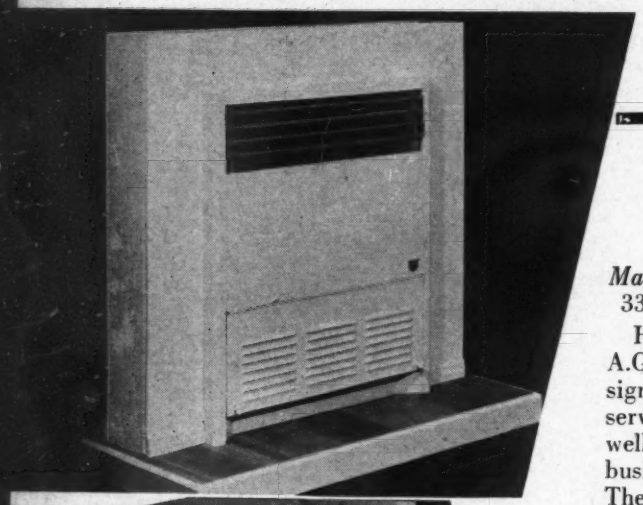
Plus 7 Great Features That Challenge All Comparison!

Heated with Gas . . . Stored in Glass

A. O. SMITH Corporation

Permaglas WATER HEATERS

Sales Pointers . . . on New GAS Appliances



VENTED WALL HEATERS

Manufacturer: Hammel Radiator Co., 3348 Motor Ave., Los Angeles 34.

Hammel single and dual FHA- and A.G.A.-approved wall heaters are designed to give complete and lasting service in the average home, and are well adapted for use in motor courts, business offices, and apartment houses. The dual models, which may be installed between two rooms, can be adjusted and regulated to heat an entire house.

The units are available in four sizes, tailored to meet the heating requirements for any space from a single bathroom to an average-size home. At present, Hammel is offering heaters in four sizes—one single and three dual models, according to these specifications:

1. 11,500 Btu input single outlet heater especially designed as fully-vented circulating type bathroom heater, but also suitable for small bedrooms, motor courts and apartments. Recesses into a standard 4-in. stud wall and is 14 in. wide.

2. 30,000 Btu input dual outlet heater designed for installation in a standard 4-in. stud wall; measures 30 in. in width.

3. 45,000 Btu input dual outlet unit, 30 in. wide, for installation in a 6-in. stud wall.

4. 57,000 Btu input dual outlet heater for installation in a 16-in. furred wall; heater measures 27 in. across.

From a broad sales promotion standpoint, two characteristics—safety and economy—are stressed. That the outer surface panels remain cool is the important safety factor, especially in a home where there are small children. Economy is two-fold: low first cost and low operating cost, the latter attained through the dual service and efficient air circulation system.

Other advantages, grouped together as important selling points, might be listed as follows:

1. No pit or basement required—This reduces the cost of installation and permits installation of the equipment on second floors. It is especially advantageous where concrete slab construction is used.

2. No flooding is possible—There is no danger of the gas flame being extinguished by flooding from water below the floor level.

3. Convenient operation—The burners are easily and readily accessible for lighting and servicing. Full access to controls and heating element is secured by simply opening the service door.

4. Effective heating—This unit, being a circulating heater, provides comfortable warmth in the rooms desired without undue stratification.

5. Attractive appearance—The attractively enameled and louvred panels blend harmoniously into the finished wall surfaces. The unit is inconspicuous and no floor space is wasted.

6. Fully vented—This fully vented unit provides proper heating, protecting the safety and health of all. The heavy duty heating element is fully enclosed within the heater, and the outer surface panels remain cool in normal use.

DESCRIPTION

DUAL UNIT

Type—A vented, gas-fired dual register heating unit for installation in the partition between rooms.
Element—Fully vented all-welded element. Constructed of heavy gauge iron for long life.
Outer Casing—High grade steel, attractively finished in baked enamel.
Rough-in-Shields—Provided in four sections, top, bottom, and sides, for ease of installation.
Capacity—Btu input figures for the three dual outlet models are 30,000, 45,000 and 57,000.
Vent—4-in. side vent.

SINGLE UNIT

Type—A vented, gas-fired single heating unit.
Element—Similar to dual unit's element.
Outer Casing—Same as on dual unit.
Rough-in Shield—Provided in one assembly.
Capacity—11,500 Btu input.
Vent—3-in. oval side vent.

Peerless Seeks Increase In Hugoton Field Price

May 8-10 the Oklahoma Corporation Commission heard an application of Peerless Oil & Gas Co. to fix a well-head price of 10 cents per Mcf for natural gas from the entire Guymon or Oklahoma sector of the Hugoton field.

Peerless asked the commission to order Cities Service Gas Co. to connect with one of its wells and to pay 6 cents per Mcf at the well-head until such time as the commission fixes a uniform price for gas in the entire field.

Natural gas is now being purchased at the wells by several pipe line and distributing companies at from 4 to 5 cents per Mcf. The Peerless Co., owning or controlling large natural gas producing acreage in the Guymon sector, testified that it had repeatedly offered its gas to Cities Service for 6 cents but no connection had been made. Attorneys for the latter declared the company ready and willing to purchase gas at what they consider the going price in the field, 4 cents per Mcf. Peerless is backed in its request for a higher field price by land and royalty owners who control about 100,000 acres of land in the area.

Since testimony could not be concluded, the hearing will be continued July 9-12.

So. Counties Expands To Increase L. A. Deliveries

Southern Counties Gas Co. has given a final okay on plans to expand the company's compressor plant facilities at Ventura at a cost of over $800,000. The new facilities are to increase deliveries to Los Angeles from La Goleta dry gas field during peak demand periods.

The construction will include a 6400 hp booster station, which will increase delivery capacity by 1½ MMcf per hour, and minor changes in the other two compressor stations at Ventura.

United Cities Organizes Liquefied Gas Operation

One of the newest liquefied gas operations to be undertaken by a public utility is Metrogas, Inc., Chicago, Ill., which will reach a potential market of 400,000 population extending from Georgia through North Carolina, Tennessee, Illinois, Wisconsin, and Minnesota. It is the propane bottled gas affiliate of United Cities Utilities Co., a public gas utility which furnishes, in seven states, services to 17 towns—two with natural gas and the remainder with butane-air, all through underground mains.

A bulk propane plant of Metrogas has been completed at Metropolis, Illinois, in which United Cities already has a butane-air franchise, and the second one will be constructed at Hendersonville, North Carolina.

It is not the plan of Metrogas to distribute propane in the entire area between St. Paul and Atlanta: operations will be confined largely to the territory within a radius of 25 miles of each of the franchised cities served by the utility company.

United Cities Utilities was one of the first companies to distribute butane-air gas through underground mains. All of the 17 town-plants now in operation were built in 1930 and at the outset all distributed butane-air. Hastings, Minn., and Vandalia, Ill., have since been converted to natural gas.

The propane operation will require separate bulk storage equipment and it is planned to serve customers on a metered basis with bills rendered monthly. The company ultimately plans to franchise dealers and to sell propane to other distributors in its bulk plant areas and will fill cylinders for others as soon as bulk plants are placed in service.

R. L. Siebin, president of Metrogas, says that "One of the primary purposes for the organization of this company was to provide a means of continuing to serve valued utility customers who moved into sections of town too far away from gas mains to continue serving them with city gas." Agreements have been worked out between the United Cities Utilities Co. and its Metrogas-operated affiliate for transfer to each other of customers on a mutually satisfactory basis.

New Homemaker's Digest Announced By Servel

R. J. Canniff, advertising and promotion manager for Servel, Inc., Evansville, Ind., has announced that the second issue of the "Homemaker's Digest", published by the Homemaker's Institute, is now available. The 24-page issue is done in four colors and features a condensation of an article by Elizabeth Beveridge, entitled, "Your Kitchen Problem Solved." Another helpful article is "How to Choose a Refrigerator" by Josephine Wayer.

The booklet is available upon request from Servel, Inc.

Flaming Gas Well May Have Commercial Value

A gas well near Tontitown, Ark., "blew in" recently with a strong flow of gas and ignited spontaneously as water well drilling equipment reached a depth of 312 ft. The flame remained at a constant height of about 8 ft. L. L. Baxter, president of the Arkansas Western Gas Co., Fayetteville, Ark., stated that the gas is coming from what appears to be a pocket and that engineers of his company do not believe a commercial producer is indicated.

State Geologist Harold B. Foxhall said that the gas which ignited probably is not flowing from a pocket, but apparently from the Sylamore sandstone, a member of the Chattanooga shale. He said that if the gas proves to be "wet," geological exploration would be justified.

The state geologist's records show that oil tests 16 years ago in northwest Arkansas revealed a flow of 100 Mcf daily at a comparatively shallow depth two miles south of Fayetteville, and a heavy gas flow in the Sylamore sandstone at 350 ft.

North Battleford, Sask. To Have Natural Gas

A franchise has been granted by North Battleford, Saskatchewan, to the Associated Development Co., Ltd., to supply natural gas to the city. The gas will be purchased from Bata Petroleums Ltd. at Unity, which has eight producing wells with 30 more to be drilled this summer. The Bata field has been supplying the town of Unity with natural gas since last November.

"Your Sales-Builder" is a "packaged" advertising and promotional portfolio, just released by Payne Furnace Co., one of the Dresser Industries, and contains a complete campaign within a single cover. It offers a series of folders, as shown in the layout, to be used for store or mail distribution—booklets, broadsides, direct mail material, display pieces, newspaper mats, catalogs, and a sample of available transcribed radio announcements. A feature of the portfolio is the 8-in. fiber recording of one of the transcribed commercials available to dealers for radio broadcast. The entire series of 45-second announcements is available on request from Payne Furnace Co., Beverly Hills, Calif.

NEW PRODUCTS

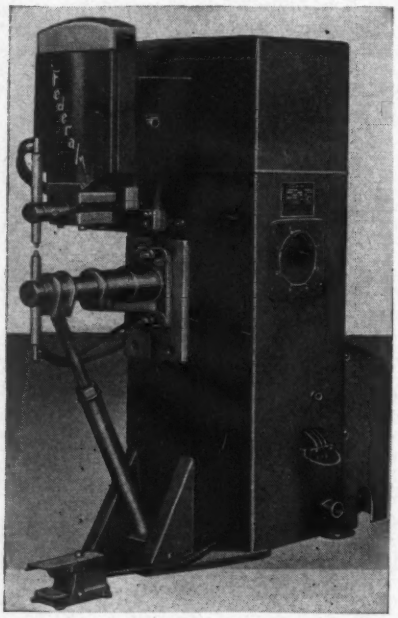
Press Type Welder

Federal Machine & Welder Co., Warren, Ohio.

Model: New Automatic Press Type Welder.

Application: Suitable for either spot or projection welding.

Description: An unusual feature of this new machine, which comes in 30, 50 and 75 Kva. capacities, is the inverted



type hydraulic cylinder through which welding pressure is applied. Cylinder is part of the slide or ram, while the piston is the so-called fixed member, its upper end being secured to the top of the welder by a heavy transverse adjustable spring.

This spring serves a dual purpose. It actuates a switch initiating the timing controls and provides a quick "reaction" for a fast follow-up on the welding stroke. Welding pressure is adjusted by the hydraulic pressure regulator and gauge. Operator has but one control to consider after welder has been set for a specific job. This is a foot switch attached to a flexible cable which permits easy positioning for each job. A single light pressure and release puts the welder through one complete welding cycle.

Plastic Coating

Baker Synthetics, Inc., 51 East 42nd St., New York, N. Y.

Model: Corrosite Air-Drying Film

Application: For coating heavy equipment; especially gas holders, purification tanks, cooling towers, pipe lines, etc.

Description: Corrosite is completely resistant to most acids, all alkalies, and many chemicals and is totally unaffected by chemical fumes, salt air, salt water or underground acid conditions. It will bond to practically any clean surface including old paint, offers greater abrasion resistance without the use of heat, takes a sharp knife to scratch it, and a three-coat application will completely eliminate deterioration caused by electrolytic corrosion. It is quick drying, easy to apply, will not crack, chip or lift and will withstand temperatures up to 250°. It is available in black, clear, aluminum and gray, in 5-gal. cans and 55-gal. drums.

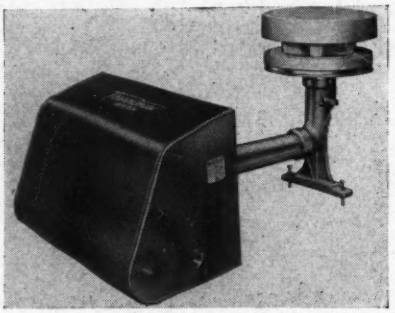
Gas Conversion Burner

Willoughby Machine & Tool Co., Willoughby, Ohio.

Model: Thermomatic Universal Gas Conversion Burner.

Application: Quickly converts nearly any size furnace or boiler to automatic gas heating, eliminating many of the usual problems of installation. No cementing or brick work is necessary, and the single model heats any size home. It can also be removed easily, since it does not alter the furnace in any way; this fact makes it particularly suited for persons who rent, rather than own, their home.

Description: Fully automatic and controlled entirely by a room thermostat, the conversion burner incorporates such features as an automatic safety pilot, automatic gas valve, and a gas



pressure regulator. In addition it is silent, has no moving parts, is efficiently designed, and has a low selling price. It carries the A.G.A. seal of approval.

Pressure Switches

The Aerotec Co., White Plains, N.Y.

Model: Three 8-oz. switches for pressure or vacuum up to 200 lbs. for use in the control of liquids or gases that will not corrode brass.

Application: To control compressors, pumps, carbonated beverage equipment.

Description: Rated at 10 amp. on 110 volt ac., available in three designs. M-500 has an externally adjustable range with a fixed differential. M-600 can be reset manually from the outside. M-700 has an adjustable differential. Pressure connection is by means of a ⅛-in. pipe nipple.

Oxygen Recorder

Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10.

Model: Bailey Oxygen Recorder.

Application: For indicating and recording the oxygen content of a gaseous mixture. Instrument has successfully been applied to boiler furnaces, kilns, many types of metallurgical furnaces, glass tanks, chemical and petroleum processes.

Description: A continuous gas sample is mixed with a vaporized liquid fuel and burned on a catalyst-filament which reaches a temperature proportional to the oxygen content. The filament resistance is a function of temperature and a simple resistance bridge is con-

nected to a null balance electronic recorder which may be calibrated in excess air, per cent oxygen, or other desired terms.

Oxygen recorders applied to all types of furnaces operating with oxidizing atmospheres permit closer regulation of fuel-air ratios, especially where multiple fuels are used, or where firing rate changes rapidly. This results in not only greatly increased economy, but also in decreased furnace maintenance. With process furnaces, it insures greater uniformity and higher quality of product.

Portable Air Supply

Scott Aviation Corp., Lancaster, N.Y.

Model: Scott Air-Pak.

Application: Carrier of air for breathing in fume- and gas-filled locations.

Description: Consists of a rubber gas mask with shatterproof plastic lenses, a metal bottle of compressed air with regulator and pressure gauge with luminous figures to show the exact amount of air in the cylinder at all times, hose connections, and a comfortable harness for the wearer. The safety device will come in two models: (1) a sling type that can be donned quickly for emergencies in chemical laboratories, refineries and (2) a pack model for the back with a larger air bottle for fire fighters, tank car cleaners, miners, granary workers, etc. Both models feature a "quick connect" which allows the wearer to breathe regular air through the open end of the hose until he enters a danger zone.

MR. GREELEY SAID IT LONG AGO...

It can be said again, this time to Industry, especially.

Go West! Go West to serve the expanding markets of the Pacific Coast and the lands of the Sunset Sea.

Here in Northern California, destined to be the industrial center of the New Pacific World, are to be found manifold advantages for new business enterprise.

Envisioning the future greatness of the fertile Golden State, P. G. and E. has been advertising in national magazines the opportunities it offers to the manufacturer and producer... radiating trade routes, multiple transportation means, available factory sites, skilled labor, natural resources AND LOW-COST ELECTRIC POWER AND FUEL.

This Company serves today more than 1,000,000 electric customers and nearly 800,000 users of gas. It operates 53 hydro and 13 steam-electric generating stations with an aggregate installed capacity of 2,311,748 h.p. Natural gas also is provided to industrial, commercial and domestic customers. If Horace Greeley were alive today we think he still would say "Go West, Young Man, Go West!"

G 206-646

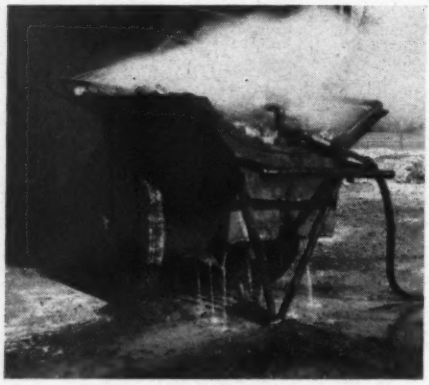
P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

OPERATING IDEAS

Pipe Sprinkler Developed for Use in Quenching Coke

DEVELOPED by C. A. Courter, Guy Cross, Tony Perry and C. E. Swanson, employees of the Grand Junction, Colo., plant, Public Service Co. of Colorado.

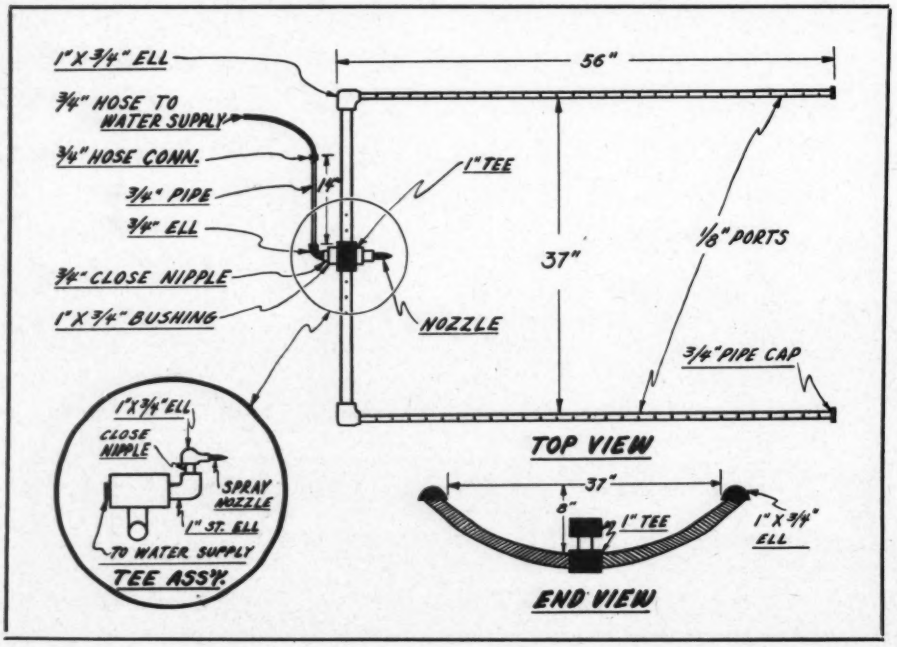
The sprinkler is constructed of 1-in. and ¾-in. pipe, and the ⅛-in. holes are in two rows. The holes in the 1-in. pipe are spaced at 3-in. centers and in the ¾-in. pipe at 4-in. centers. A raised sprinkler head for spraying through the center of the cart is located in the middle of the 1-in. section. The lower row of holes is set



to spray about ¾ of the way up the charge, and the top row is set to spray over the top of the charge.

The device is detachable and may be used on the floor for quenching charges from bottom retorts. When in use on the coke cart, the sprinkler rests on the flared edges of the bed and is easily removed when dumping the cart. The coke is quenched as it is drawn from the retort, saving the time required for other methods of quenching, and the time between emptying and recharging the retort is reduced. Less water is required per charge and the greatly reduced temperature of the cart increases the life of both tires and metal.

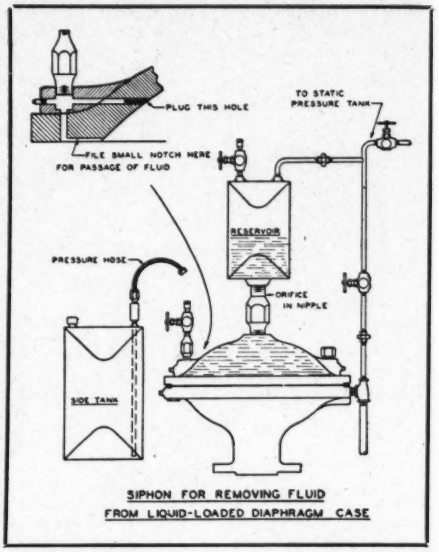
Since the coke is cooled as drawn, working conditions for the operator are much improved.



Siphon for Draining Liquid Loaded Diaphragm Case

FLAVE C. HALL and L. A. VALENTINE of Panhandle Eastern Pipe Line Co., winning first prize in monthly competition conducted by "Panhandle Lines."

Siphoning of fluid from a liquid-loaded diaphragm case on an Emco regulator is accomplished by the use of a device invented by Hall and Valentine, and which is now in use. It is said to eliminate air pockets inside the case when filling, because the liquid enters at diaphragm level and air is forced out as the case and reservoir are filled. Furthermore, it assures complete drainage down to the diaphragm level so that very little of the fluid is lost when the diaphragm case is removed.

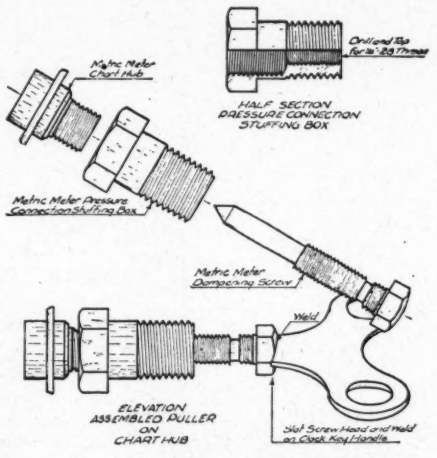


SIPHON FOR REMOVING FLUID FROM LIQUID-LOADED DIAPHRAGM CASE

Metric Chart Hub Remover

J. D. GERMAN, Phillips Petroleum Co., Presented before the 1945 Wrinkle Class, Southwestern Gas Measurement Short Course, conducted by ROY S. PEACE, Jr., Southern Natural Gas Co.

This chart hub puller as shown in sketch was made to remove Metric meter clock chart hubs. It was found in many instances, in replacing Metric clocks in the instrument, that the chart hub was very difficult to remove,


Metric Meter Chart Hub
Drill and Tap for 1/8" Pipe Thread
HALF SECTION PRESSURE CONNECTION STUFFING BOX
Metric Meter Pressure Connection Stuffing Box
Metric Meter Dampening Screw
Weld
ELEVATION ASSEMBLED PULLER ON CHART HUB
Slot Screw Head and Weld on Crank Key Handle

due to freezing of the hub on the clock shaft. This remover can be easily made from materials on hand at any instrument shop, and has proven to be an aid in preventing the breakage of clock parts, due to excessive force applied by other means such as the use of pliers or opposing screwdrivers to pry the hub from shaft.

1 Homemaker's Digest—Cast in the highly successful "digest" form, this four-color magazine condenses outstanding articles on refrigeration and other household subjects from America's leading women's magazines. Each issue also contains specially written editorial stories dramatizing the superiority of the Gas Refrigerator and other gas-using appliances. An exclusive Servel-sponsored Gas Industry promotion.

2 Celebrity gas bill insert—Ideal enclosure for monthly bills. Uses Fred MacMurray's "box office appeal" to tell Servel's story of silence and no moving parts.

3 1946 line folder—Explains with words and pictures why the Gas Refrigerator is "Different From All Others." Illustrates and fully describes each of the new 1946 Servel models.

4 Apartment house folder on Gas Refrigeration—Designed to sell the men who buy refrigerators by the *dozens*. It shows how Servel's silence insures tenant satisfaction...how its continued low operating costs save repair and replacement parts bills.

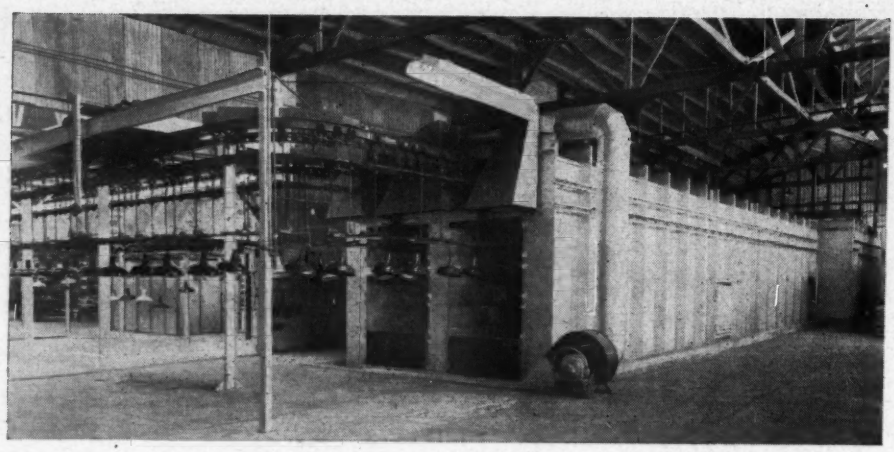
5 Illustrated envelope enclosure—Gives housewives good reasons why they should wait for the refrigerator that "stays silent, lasts longer." Testimonials emphasize Servel's unmatched record of wartime dependability.

6 Builders' folder on Gas Refrigeration—Shows how builders can profit by Servel's continued low operating and maintenance costs. Gives 7 big advantages of Gas Refrigeration. Illustrated with "success stories" of long-term Servel installations in homes and apartment houses.

7 Architects' folder on Gas Refrigeration—Contains complete specification and installation data architects need now when they are planning new homes. Describes in detail Servel's simpler method of operation, cabinet construction, finish and equipment.

Plan now to use these Servel folders and booklets in your all-out drive for a bigger gas load. For complete information on these dramatic promotion helps, write today to Servel, Inc., Evansville 20, Indiana.

Servel, Inc.
Evansville 20, Indiana



Large U-type continuous enameling furnace.

GAS-OIL FUEL SYSTEM

Featured in U-Type Enameling Furnace

THE installation of a large U-type continuous enameling furnace, fueled by either gas or oil, is one of the most recent developments in the expansion program of Smoot-Holman Co., 321 North Eucalyptus Ave., Inglewood, Calif.

Incandescent, fluorscent and flood lighting equipment, and bathtubs, sinks, washbasins and kitchen ranges are some of the enameled products which are made or finished at Smoot-Holman. For 30 years, the company has specialized in designing lighting fixtures for commercial and industrial use.

The new enameling furnace was designed and built by the Ferro Enamel Corp., Cleveland, Ohio. It is a full muffled furnace, using an overhead conveyor to carry work through the furnace. The burning chamber for the oven is 18 ft. 8 in. long, 9 ft. 3 in. wide, and 5 ft. 6 in. high. Including the pre-heating and cooling zones, the work travels approximately 160 ft.

The outstanding feature of this oven is its combination oil and gas fuel system which changes over from natural gas to oil by merely flipping a toggle switch. This dual fuel system was developed during the war to cope with the problem of supplying fuel to industrial plants which were in need of standby fuel when the use of natural gas was curtailed due to expanded war production facilities in the Southern California area. It was designed and built by the Petr-O-Fire Co., Los Angeles, Calif.

Other advantages of this fuel system are that no control changes are necessary with this type of equipment, and the same temperatures can be maintained on either the gas or oil cycle. The combustion and flame characteristics are the same with either type fuel. Air passage is also the same on both cycles; however, on the oil cycle air is pre-heated to assure complete vaporization of the type fuel used.

The system was designed so that it is possible to burn petroleum fuels such as kerosene distillate, stove oil, naphtha or gasoline of any grade. It proportions the liquid fuel and vaporizes it in a stream of heated air. Flame characteristics produced on the oil cycle are similar to those of natural gas, and furnace temperatures up to 3000° F. are easily obtained. The device consists of a blower, air heater, and venturi mixer, with zero gas governor and liquid fuel metering chamber attached. When operating on the oil cycle, air is delivered by the blower to the heater where it is heated to the required temperature. The air then passes through the venturi mixer where fuel is injected into the heated air stream and vaporized.

The resultant fuel-air mixture is then delivered through an insulated conduit or manifold to the point of firing, and burns in standard burners designed to burn pre-mixed air and gas fuel. Numerous types of pre-mix burners have been used on this machine with excellent results. In fact, none has been found that does not perform satisfactorily.

When operating on the oil cycle, fuel is supplied from storage by means of a pump through a pressure regulator and filter to the fuel metering chamber in which the liquid level is maintained constant by a float operated valve. From the metering chamber, fuel is injected into the system at the throat of the venturi through an adjustable valve.

The fuel air ratio is maintained constant through the entire range of turn-down. Fuel and air proportions may be set to produce neutral flue gas atmosphere on both gas and oil cycles, or may be adjusted to produce an oxidizing or reducing atmosphere, if desired. Furnace temperature is controlled by operating a valve on the air supply. This valve is connected to a controller, and temperature can be maintained automatically constant without human attention.

Similar fuel systems have also been installed for the plant's paint drying oven and for heating the solution in the acid pickling tanks.

NBFU To Give Utilities Fire Insurance Facts

W. E. Mallalieu, general manager of the National Board of Fire Underwriters, 85 John Street, New York 7, has announced that capital stock fire insurance companies, after studying the basic information on which the fire insurance business operates, have developed a new system which will provide fire insurance experience data throughout the nation on a broader, more uniform, adequate and accurate basis than ever before.

Statistics on premiums and losses will be kept separately in two classes in the electric and gas businesses and one in the electric traction business. The new system will afford an improved statistical foundation for the business judgments of companies in insuring against fire hazards, for the action of state authorities in regulating fire insurance, and for general purposes.

Since 1932 figures on fire losses and premiums in industries have been kept in a dozen classes. The new system of classifying fire insurance statistics follows generally divisions of the Department of Commerce Index of Business and Industry. Experience data from more than 200 capital stock insurance companies will be kept separately in 65 classes in manufacturing, four in mercantile fields, and 20 in non-manufacturing business establishments. One of the chief aims in the public interest is to give a clearer statistical picture of industry's problems of fires and fire insurance than has ever been given.

Permit to Serve Greenland Asked by Arkansas Western

Permission to serve the town of Greenland, Ark., with natural gas from the Fayetteville transmission line of the company has been asked by the Arkansas Western Gas Co. in a petition to the Arkansas Public Service Commission. A franchise has been granted by the town and the company has agreed to provide service for public buildings and residential consumers under the existing rate scale on file with the Commission. Cost of making the extension would be about $12,000.

WE BUILD FLOOR FURNACES

Exclusively

We can, and do, concentrate our entire engineering and manufacturing resources on this one product.

This *specialization*, we believe, has a very definite bearing on the quality and performance of Ward Floor Furnaces. It explains, in large part, the well-established customer preference for Ward *in every area where Ward is sold.*

Dealers appreciate the sales advantages of Ward — its 37-year reputation — its simplicity and efficiency in operation — its ease of installation.

We wish we could take care of all the dealers who want Wards. However, our first duty is to our present dealers and we are supplying them as rapidly as circumstances and expanded plant facilities will permit. We are looking forward to the day when we will be able to offer additional dealers the sales advantages of Ward Floor Furnaces.

★

WARD HEATER COMPANY

1800 W. Washington Blvd., Los Angeles 7, Calif.

37 YEARS OF "KNOW-HOW"

WARD
FLOOR FURNACES

ABSTRACTS OF ASSOCIATION PAPERS

Technical Conference On Domestic Gas Research

Abstracts of papers presented at the West Coast Technical Conference on Domestic Gas Research, jointly sponsored by the American Gas Association and the Pacific Coast Gas Association, held in Los Angeles, May 16-17.

Fundamentals of Heat Absorption by Utensils in Gas Range Ovens. Joan Huck, A.G.A. testing laboratories. Quantitative data obtained from an investigation of fundamentals of heat absorption by utensils in gas range ovens are presented and graphically illustrated to show the amount of heat absorbed by utensils of different size and finish. Effects of oven interior finish on speed and efficiency of oven cooking are discussed. Relative percentages of radiant heat and convected heat utilized by utensils at different oven temperatures are illustrated. Analysis is also made of the effect of oven loading on amount of heat absorbed, oven maintaining rate and temperature of interior oven walls.

Technical Progress in Totally Aerated Burner Studies. Herbert Luoma, A.G.A. testing laboratories. Extents to which factors of burner design influence tendency to flash back are presented in light of their importance in the design of totally aerated gas burners. Theory of flash-back phenomena is discussed and data are given to illustrate the effect of burner port size, depth and spacing on flash-back limits for different gases.

Current Research on Gas Burner Injection Characteristics and on Pilot Burners. Earl J. Weber, A.G.A. testing laboratories. Methods employed in development of an equation expressing primary air injection of atmospheric gas burners as a function of such burner design factors as throat diameter and slope of venturi tube, throat to port area ratio, port size and depth are discussed. Brief mention is also made of the scope of two research projects now in progress on pilot burners and the procedures followed in their conduct.

Oven Heat Distribution in Domestic Gas Ranges. F. E. Hodgson, A.G.A. testing laboratories. Effects of various changes in gas range oven construction on heat distribution are briefly reviewed. Factors dealing with heat distribution test procedures are evaluated in terms of allowable variations in standard test methods. Simplified methods for approximating heat distribution without baking actual cakes developed as the result of present research are also set forth.

Galvanic Corrosion of Dissimilar Metals as Applied to Hot Water Storage Heaters. C. F. Prutton, Case School of Applied Science, Cleveland, Ohio.

It is not unusual for piping of one type of metal to be connected to a hot water heater of another type of metal although it has long been known that the corrosion of a metal may be accelerated by contact with another metal. This corrosion is the result of an electrochemical mechanism and has been termed "galvanic corrosion." The total weight loss of an anodic electrode of a couple, if the mechanism is entirely electrochemical, is directly proportional to the current flowing from the anode areas to the cathode areas. On the basis of the importance of galvanic corrosion in hot water heating systems, a research program has been undertaken by the American Gas Association Committee on Industrial Gas Research. The project, known as DGR-3-WH, "Galvanic Corrosion of Dissimilar Metals as Applied to Gas Hot Water Storage Heaters," is being studied at Case School of Applied Science, and is proceeding in the following manner:

Eighteen 30-gallon automatic storage water heaters with copper, galvanized iron, black iron, and vitreous lined tanks are connected to various piping systems which have ten ft. of pipe to the inlet of the heater and 50 ft. of pipe on the outlet of the heater. Except for blank or control tests, the piping will be a different metal than the tank to which it is connected. The rate of corrosion of these bimetallic systems will then be studied at 160°F. In addition to corrosion resulting from action caused by dissimilar metals, some of the water heating systems will be used as an electrical ground as encountered in home installations. Both direct currents and low frequency alternating currents will be used. Different waters and their effect on galvanic corrosion will be investigated. Waters with the following properties will be used: (1) moderate hardness, (2) low pH, (3) high pH, (4) aggressive due to high CO_2, and (5) high copper solvency resulting from chloramine treatment. As the testing proceeds, it may be necessary to include other waters. Rate of progress of corrosion will be followed by weight gain or loss of a section of the pipe nipple, continuous potential measurements, and by visual observation.

The A.G.A. Research Program on Venting. E. C. Adams, Adams Bros. Manufacturing Co., Pittsburgh, Pa. Discussing the problem at hand from a business management, rather than a technical, point of view, the author points out the adverse criticism directed toward gas as a result of condensation in insulated houses. Because of the widespread popularity of such houses, the industry must devise better means of venting so that interior air will be thoroughly diluted with the relatively dry outside air in such a manner as to avoid drafts or discomfort. He believes that properly ventilated houses where gas is the only fuel used will be more livable than tightly sealed houses using other fuels. With this as a sales talking point, builders and the public may be sold on the benefits of using gas. Further study of research in venting is scheduled for publication in a future issue of GAS.

Abstracts of papers presented at the West Coast Technical Conference on Domestic Gas Research, sponsored by the American Gas Association and the Pacific Coast Gas Association, in Los Angeles, May 16-17. The four papers abstracted here, representing findings to date, are not for publication.

Fundamentals in the Use of Radiants as Applied to Domestic Gas Range Broilers. Milton Zare, A.G.A. testing laboratories. Comparative test data on domestic gas range broilers with and without use of radiant materials are presented. Effects of mass and width of radiant materials on preheating time, maintaining rates and effective broiling areas are summarized. Results obtained with a special procedure developed for measuring radiant heat and effects of placement of radiant materials with respect to the broiler burner are given. Preliminary efforts to establish a measure of "quality" for broiled products microscopically are also described.

Water Heater Design for Customer Satisfaction. C. A. Thorpe and Roy A. Siskin, A.G.A. testing laboratories. Increased hot water demands such as brought about by introduction of automatic washing machines on the consumer market are discussed. Based on data available for washers of this type, a theoretical gas water heater capable of meeting these requirements is described. Comparative data are presented on the ability of contemporary automatic underfired gas storage water heaters to supply a reasonable percentage of its storage capacity as usable hot water. Temperature fluctuations at the top of the storage vessel after various types of draws and during standby conditions are also reported.

Current Central Heating Research. Robert C. Weast and James A. Morse, A.G.A. testing laboratories. This paper consists of two sections. The first includes a discussion of a simple heat transfer unit employed to obtain knowledge of the effect of different types of gas flames on heat transfer occurring in the flame zone of the combustion chamber. The second presents highlights of a survey recently conducted to determine the popularity, potential demand, and practical effectiveness of gas-fired summer-winter hook-ups designed to provide both heat and hot water during the heating season and hot water during the remainder of the year.

• With this issue, GAS is instituting a new feature—"Abstracts of Association Papers," in which we plan to give our readers each month capsule digests of many of the important papers delivered before association conferences. In this department our aim is chiefly to give the reader an inkling as to what the subject deals with. Many of the papers abstracted here are obtainable in unabridged form from the various associations.

Not for just a year

...BUT ALWAYS

Only FLORENCE offers all these PLUS advantages for long-time, steady profits

1. 74 years of experience in manufacturing and merchandising.
2. A long record of financial stability and reliability.
3. "Straight-line" assembly methods provide tremendous production capacity.
4. A policy of *direct* selling that enables you to offer the greatest possible values.
5. Service facilities that put merchandise *where* you need it *when* you need it.
6. Appliances designed and tested for easy servicing at low cost.
7. A broad line of cooking and heating appliances for all needs.
8. Widespread consumer demand created by powerful, hard-hitting advertising and sales promotion.

AS THE OLD SAYING GOES, "You're a long time married." So take a look before you leap. Take a look at the 8 advantages shown here that the Florence Line of ranges and heaters offer you. All 8 of them reflect the character of a company worth tieing to for the soundest business future. All 8 point the way to attractive profit opportunities not for just a year but for as long as you'll be selling ranges and heaters. If you're planning BIG for sales, get the backing of a BIG resource. Choose the Florence line and be sure!

FLORENCE STOVE COMPANY . . . General Offices and Plant: Gardner, Mass. Western Offices and Plant: Kankakee, Ill. Southern Plant: Lewisburg, Tenn. Sales Offices: One Park Ave., N. Y.; 1459 Merchandise Mart, Chicago; 53 Alabama St., S. W., Atlanta; 301 No. Market St., Dallas

FLORENCE
Gas Ranges

ASSOCIATION ABSTRACTS

Current Water Heater Research. W. B. Kirk, A.G.A. testing laboratories. Experiences with existing designs of bimetallic thermal elements as employed in automatic gas pilots are discussed briefly and necessity of further information for their most effective fabrication and application outlined. Results of laboratory tests of such elements conducted to secure the basic information needed are discussed and graphically presented. Design and installation conditions affecting performance of such devices are reviewed. A new investigation of special types of burners as applied to water heaters is described briefly.

A.G.A. Distribution and Motor Vehicle Conference

Abstracts of papers presented at the American Gas Association Technical Section Distribution and Motor Vehicle Conference, Chicago, Ill., April 15-17.

Safe Distribution Practices. L. K. Richey, Michigan Consolidated Gas Co., Detroit, Mich. Discusses barricading, chain falls, wrenches, meter orders, appliance adjusting, meter tinning, files, and soldering coppers—rules of safety to apply to each.

The Effect of Anions on the Performance of Sacrificial Anodes. Dr. K. F. Wight, A.G.A., and R. F. Hadley, Susquehanna Pipe Line Co, Philadelphia, Pa. Reports data collected during the study of conditions under which aluminum, magnesium, and zinc are suitable for cathodic protection purposes, considering such factors as the effect of metal purity, metal alloy materials, anodic polarization, and backfills for preventing anodic polarization.

Automatic Loading of District Governors. Frank J. Woolfenden, Michigan Consolidated Gas Co. How to meet the problem of pressure reinforcement of existing low pressure systems to handle adequately the greatly increased loads in residential sections is treated in this paper. The use of the automatic loader to allow large pressure drops is developed.

Accident Prevention—Not a One-Man Job. Clark E. Woodward, Illinois Institute of Technology. Every individual in an organization must be educated in the ways of safety, and "must accept responsibility not only for working safely for his own sake but also for the safety of those about him." The safety engineer alone cannot conquer accidents.

Standardization of Truck Bodies. Sidney F. Gale, New Orleans Public Service, Inc. With decreased selling prices of truck bodies through mass production as his goal, the author tabulates ways in which bodies may be standardized for use throughout the gas distribution industry. Large service body, small service body, and compressor body are considered, and proposed standards are projected on a set of drawings.

Emergency FM Radio Communication. J. P. Woodward and W. R. McMillan, Union Electric Co. of Missouri. Relates success of system used in Greater St. Louis since February, 1945. Installation is described, as is equipment; troubles during the first 10 months of operation are tabulated.

A.G.A. Sales Conference on Industrial, Commercial Gas

Abstracts of papers presented at American Gas Association Sales Conference on Industrial and Commercial Gas, Toledo, Ohio, March 29-30, 1946.

Are Your Retail Bakeshops Gas Fired? Carlton W. Roll, Brooklyn Union Gas Co., Brooklyn, N. Y. How the use of gas has revolutioned the baking industry, and what should be done to enroll new customers and sell more appliances is discussed.

Building Prestige and Sales in the Commercial Market. Leon Ourusoff, Washington (D.C.) Gas Light Co. Prestige and sales are predicated upon results, trust, and promotions. How to develop these factors is explained.

Where Do Gas-Oil Burners Fit In? Otto Lutherer. (See GAS, April, 1946, p. 31)., North American Manufacturing Co., Cleveland, Ohio. Applications of this fuel combination are limited by certain considerations. On the other hand, such burners have many uses, and how they might be constructed is detailed by the author. Drawings of sample burners are provided, together with figures on mixing for ideal combustion.

The Cooking Problem Involved in the Expanding Public School Feeding Program. Margaret Crozier, board of education, Philadelphia. What Philadelphia is doing to keep pace with increasing demands for school feeding is presented in the paper as a guide to other school authorities.

The Church Kitchen as a Market for Gas. P. W. Craig, Equitable Gas Co., Pittsburgh, Pa. That the gas appliances used in a church kitchen can be either a promotional asset or a definite liability is the theme of this paper. To sell replacements for obsolete and poorly-functioning gas appliances in order to present a favorable picture to the large number of housewives who use church equipment is Craig's aim.

Advertising Paves the Way. J. P. Leinroth, Public Service Electric and Gas Co., Newark, N.J. Although advertising in the gas industry is on the soundest basis in its history, there are certain challenges that must be met if it is to achieve its goal. What these challenges are and how they may be met is told by Leinroth.

Water Heaters and Steam Boilers—Load Builders for Commercial Gas. O. M. Olsen, Sellers Engineering Co., Chicago. Loadbuilding through increased promotion of water and steam appliances is projected here as one of the great opportunities of the industry for the future. Olsen creates a hypothetical "composite master salesman" to do the job.

Your Part in a National Promotion Campaign. J. A. Rockefeller, Public Service Gas and Electric Co., Newark, N.J. Rockefeller reports on the activities of the Food Service Equipment committee of the A.G.A. intended to assist the gas utility to set up a promotion campaign.

Latest Developments in the Use of Gas for Firing Glass Melting Tanks. F. G. Schwalbe, Toledo Engineering Co., Toledo, Ohio. Illustrated with graphs. Schwalge points out the ability os gas to radiate, and glasses to transmit radiant energy, and explains why gas is ideal as a glass melting fuel.

You Must Get the Small Tailor Boiler Load. Harry B. Wilson, Brooklyn Union Gas Co., Brooklyn, N.Y. Presents a study of gas consumption figures for retail tailors, results of a Brooklyn survey, field investigation, discussion with tailor boiler mechanics, need for a redesigned 1½ hp boiler, discussion of possible future actions, and other data.

Report of Subcommittee on Compressor Tools—B. D. Connor, Boston Consolidated Gas Co., Jamaica Plains, Mass. Part of the 1946 report of the committee on operation of public utility motor vehicles, American Gas Association. Number of compressors, paving breakers, spades or diggers, rock drills, tampers, chippers, and miscellaneous tools in use is tabulated and broken down. Selection and operation of tools is discussed, and recommendations are made by the subcommittee.

Zinc Anodes for Preventing Corrosion of Distribution Mains. C. L. Morgan, Houston (Texas) division engineer, United Gas Corp. In 1933, some experiments in cathodic protection were tried by United Gas Corp. in an effort to prevent corrosion which was spreading through poorly coated steel mains which had been installed between 1925 and 1930. It was not until 1942 that pressure of demands for widespread use of protective devices, caused by an increasing number of leaks, brought about the standard use of cathodic protection throughout the system. The story of what was done and how, and the problems met and solved, is extensively reviewed by the author. Results are graphically portrayed in charts showing spread of leaks, zinc anode performance with various backfills, division of current among the plates in a vertical stack of five plates, theoretical operating life of a 14-lb. zinc plate at 90% current efficiency, etc.

Comments by Guy Corfield, Southern California Gas Co., on Morgan's paper. One element in using cathodic protection that is in doubt is the continued functioning of the zinc rods because of the possibility of a buildup of corrosion products that may reduce or stop the flow of current. Therefore, extensive installations should not be made until more tests have been made with various types of soil.

Comments by Kirk H. Logan, Washington, D. C., on Morgan's paper. The engineer who attempts to duplicate the installation under different conditions will sooner or later realize the need for a clear statement of principles which govern cathodic protection. Morgan's paper, Logan contends, shows results of practice without giving a clear statement of theory.

Heating by Immersion and Submerged Combustion. Charles C. Eeles, Ohio Fuel Gas Co., Toledo. This type of heating allows gas the optimum use of its form value and results in highest utilization efficiencies. The temperature of the heating elements never greatly exceeds that of the solution and their mass is relatively small, thus minimizing heat

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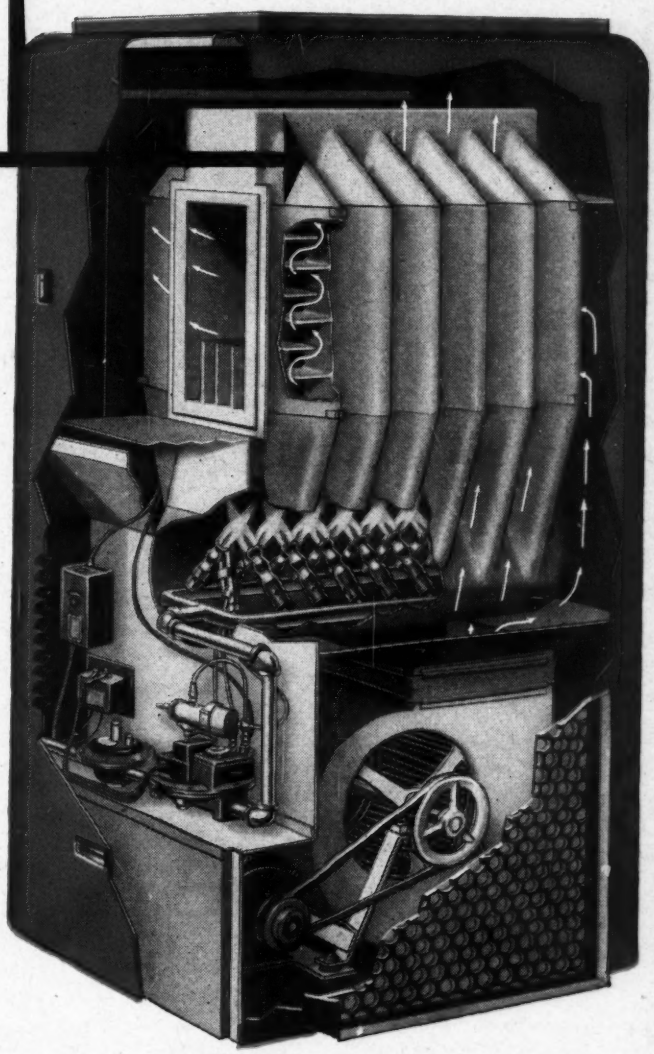
With the New Long-Life, High Efficiency

CAST IRON HEAT EXCHANGER



The important heat exchanger of the new gas-fired Tempered-Aire is built of cast iron, because Gar Wood engineers as well as Utility Company engineers agree that cast iron assures long life and high efficiency. Combustion takes place in the extra-large firebox that eliminates flame impingement with resultant hot spots. The hot products of combustion pass upward from the firebox and divide as they enter triangular shaped channel-ways containing cast-in baffles. These baffles direct the hot gases back and forth against the side walls as they move upward to the collecting chamber at the top. The cold air from the blower is forced over the corrugated surface of the heat exchanger, thereby providing a rapid and substantially complete exchange of heat between the products of combustion and the air from the blower.

A second path is provided for the cold air passing up the rear of the firebox. This path leads through an air tunnel in the center of the heat exchanger. The bottom of the tunnel is the top of the firebox. It contains three, deep, integrally-cast fins that transfer the heat into the air. On leaving the tunnel at the front of the exchanger, the warmed air joins the warm air emerging from the passageways at the sides.

The entire construction of gas-fired Tempered-Aire is designed to give a close contact of hot gases and air that results in a high extraction of heat with a marked saving of fuel. The assurance that they will get clean, comfortable, even heat at low cost over a period of many trouble-free years, makes Gar Wood gas-fired Tempered-Aire the heating unit that modern home owners want.

This advertisement describes postwar equipment which is not now available. It does not constitute an offer to sell or deliver and no suggestion is made that orders be solicited. This notice will cease to apply when ceiling prices have been established by the O.P.A.

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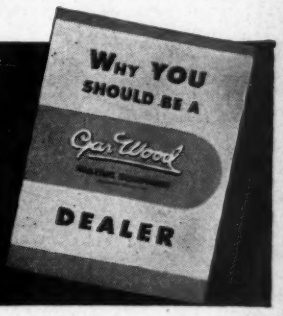

storage in them and any consequent adverse effect on temperature control. Immersion and submerged combustion is one of the most important tools at the command of the industrial engineer. Eeles includes formulas and a curve sheet in this paper.

Something New—Interruptible Quenching. Carl H. Lekberg, Northern Indiana Public Service Co., Hammond, Ind. Lekberg explains the use of interruptible quenching during the process of heat-treating steel, and the application of gas during the process. There are three types of interrupted quenching, Austempering, Isothermal quench, and Martempering. All three eliminate or at least greatly reduce the tendency toward cracking and distortion inherent in the normal quench.

The Growing Use and Sales Importance of Prepared Atmospheres. E. G. deCoriolis, director of research, Surface Combustion Corp., Toledo, Ohio. deCoriolis points out that of all the wartime applications of gas, none seems to possess such potentialities for future application as prepared atmosphere uses in the heat processing of metals. This application is broken down into two types: 1) the prevention of changes in the surface of the metal during treatment, and 2) the causing of purposeful changes in surface conditions. Some of the many uses are outlined.

Practical Phases of Applying High-Speed Direct Gas Heating. Frederic A. Hess, Selas Corp. of America, Philadelphia, Pa. High-speed heating costs of gas and induction methods on specific jobs are compared to show gas' advantage over electricity from an economic standpoint. Imagination is needed in developing this field.

PCGA Technical Section Utilization Conference

Abstracts of papers presented at Pacific Coast Gas Association Technical Section Utilization Conference, April 24-25, Sacramento, Calif.

The Commercial Dehydrator. C. C. McRae, Pacific Gas & Electric Co., San Jose, Calif. An exhaustive study of problems, design, development and use of food dehydration methods is presented. Devices employed are broadly classed as batch dryers and continuous dryers, the former including compartment and vacuum dryers, and the latter including tunnel dryers as well as conveyor, rotary, and spray dryers. Charts showing yield and drying rate, a table of costs, and a drawing of a standard tunnel type are attached.

Checking for Combustion Products Leakage in Heating Elements of Gas Warm Air Furnaces. C. J. Sandusky, Southern California Gas Co., Los Angeles, Calif. Methods involving visual inspection, pressure testing, indirect methods involving the visual sense, and the olfactory sense, and methods involving the use of instruments are outlined. Drawings of portable carbon dioxide indicator designed by the Southern California Gas Co. in 1938 are included. This paper is scheduled for future publication in GAS.

Dealer, Utility Relations. Walter Lind, Pacific Gas & Electric Co. Cooperation between dealer and the gas utility is discussed in Lind's paper, and recommendations as to what should be done in the future are made.

Codes and Standard Practices Covering Installation of Gas Appliances. H. W. Geyer, Southern Counties Gas Co. (See P. 43.) A brief for standardizing codes which are now confusing, sometimes conflicting, and administered by so many agencies and departments that they cannot operate effectively. Geyer gives pointers on how such standardization might be obtained.

Current Developments in Employee Training. C. C. Westmoreland, Southern California Gas Co. The course in use by the Southern California Gas Co. employs both classroom and field instruction. Originally, field training occupied about 90% of the instruction time, but recently, through experimentation, revisions have been brought about until now classroom training is allotted 87% of the total. This fact has reduced the overall training time by 60%. What is being done and how, and the results accomplished are told by Westmoreland in this paper, which is scheduled for future publication in GAS.

Standard Analysis Forms for Tabulating Customer Service Orders. G. H. Pickett, Southern California Gas Co. The most important considerations in customer service work are results and costs, the latter being dependent upon time involved. Pickett tells how to set up a time study so that costs may be readily determined.

Here's a coupon with top value for the holder—*your gas holder.*

From it you'll get *positive* information about the internal condition of your wet-seal gas holder—information that will save you money in reduced maintenance and replacement costs. You'll be able to safeguard failures due to corrosion, misalignment or improper lubrication.

The coupon method of internal inspection is only one of the steps in the Stacey Brothers Gas Holder Inspection Service. Based on scientific survey, thorough examination, laboratory tests and engineering study, we'll give you a comprehensive report and specific recommendations to help you insure maximum life for your holder.

Now's the time to let us give you this personalized annual inspection service. Many prominent operators already have entered their contracts with us for the 1946 season . . . and we've served some of them year after year. Their contract renewals are your best assurance of our ability to give you prompt, economical and efficient inspection. May we discuss your requirements with you?

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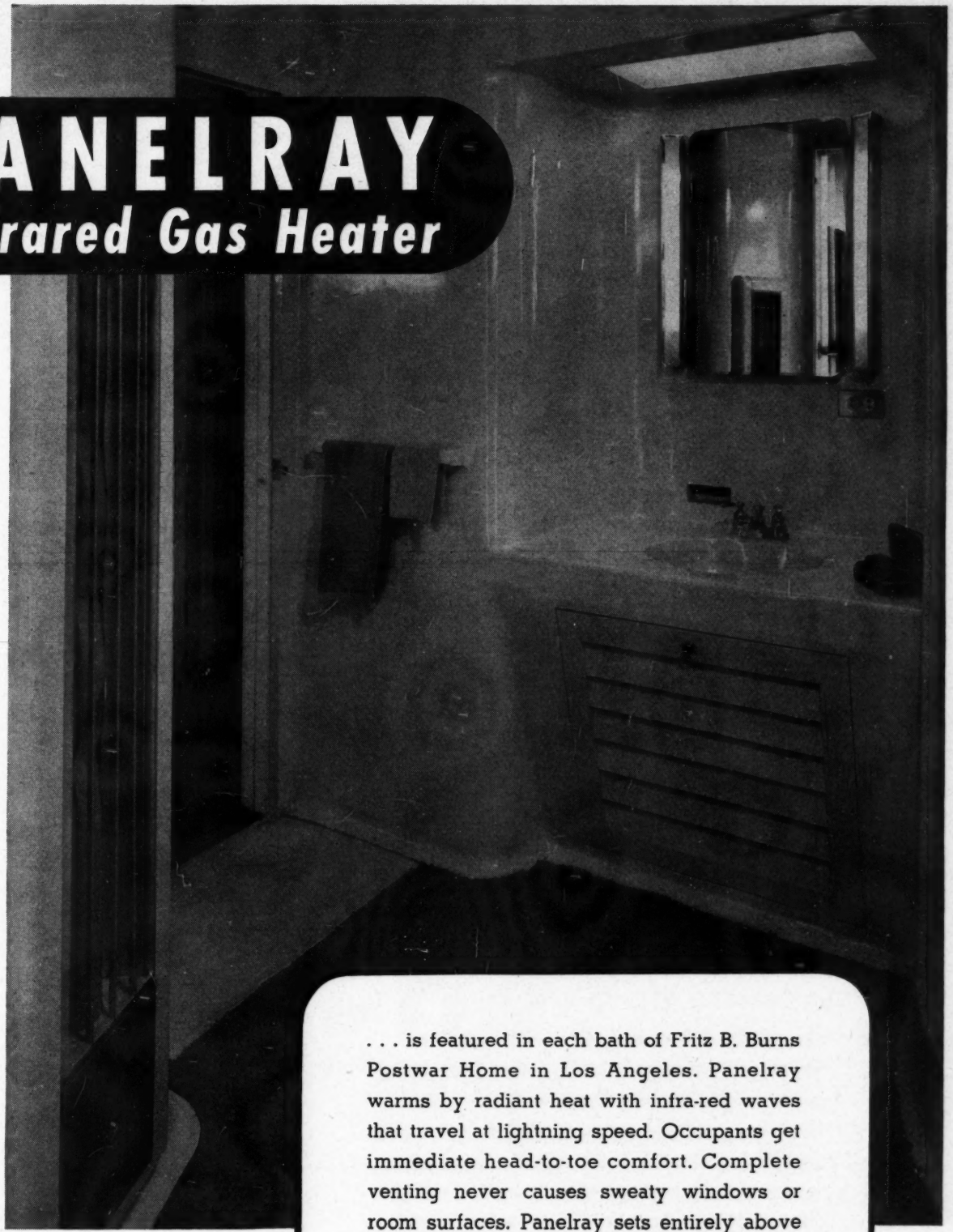

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. . . is featured in each bath of Fritz B. Burns Postwar Home in Los Angeles. Panelray warms by radiant heat with infra-red waves that travel at lightning speed. Occupants get immediate head-to-toe comfort. Complete venting never causes sweaty windows or room surfaces. Panelray sets entirely above the floor, stands only 1½" out from wall and may be installed in new homes or homes already built. The Postwar Home also features two Day & Night water heaters.

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is a "jungle" of expensive landscaping . . . impossible to trench through.
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Dallas Thankful For Gas During Coal Strike Crisis

"By the Grace of God, geography and lots of natural gas," the "Dallas Southwest" is unhampered by the current coal troubles afflicting the north, east, and the midwest, reads an advertisement appearing in several New York newspapers recently.

The ad, running a full three or four columns, was sponsored by the Dallas Chamber of Commerce of Dallas, Texas, and points out the advantages offered by the Southwest to industry. Resources there, the ad proclaims, "are so diversified, their sources so dispersed, and their transmission to the customer so well integrated that the Dallas Southwest cannot be dominated by the will of one man. . . . The . . . almost inexhaustible supply of natural gas provides the best and cheapest fuel for industrial as well as domestic uses."

Warren Petroleum Corp. Acquires Hanlon Co.'s

W. K. Warren, president, Warren Petroleum Corp., and E. I. Hanlon, chairman of the Hanlon Co.'s, jointly announced in Tulsa May 17 that negotiations by which the Warren Corp. had acquired stock and properties of the Hanlon Co.'s had been completed for a price of $12 million.

The Hanlon Co.'s own and operate gasoline manufacturing plants with a capacity of 73 million gallons annually, natural gasoline marketing operations handling in excess of 250 million gallons annually, tidewater terminals, a fleet of tank cars, crude oil producing properties with gross production over 5000 bbl. and a net production of 3500 bbl. daily, and undeveloped potential oil and gas producing lands in excess of 225,000 acres.

Arkansas Gas Plant Model Presented to Governor

A model of the Columbia gas-treating plant of the Arkansas Fuel Oil Co., associated with the Arkansas Louisiana Gas Co., has been built by H. B. Wright, curator of the Louisiana State Exhibits building, Shreveport. The model, which reproduces the process used in treating sour gas, of which there is a reserve of 130 billion cu. ft. in Arkansas, has been presented to Governor Ben Laney of Arkansas and set up in the state capitol at Little Rock.

Fort Smith Gas Corp. To Refund $700,000

Fort Smith Gas Corp., owner and operator of the natural gas distribution system at Fort Smith, Ark., has been authorized by the Arkansas Public Service Commission to refund $700,000 of its bonded indebtedness. The company estimated that the exchange will allow a saving of about $119,000 in annual interest charges during the life of the new bond issue.

Gas Utility Sales Decline

March sales of the gas utility industry declined 8%, according to an A.G.A. announcement. This represents a drop from 2379 million therms in March, 1945 to 2360 million therms this year. The association's index number of total gas utility sales was 179.8 for March (1935-39 = 100).

Winners of the Magic Chef Design Competition

THESE WINNERS of the Magic Chef design competition have contributed greatly to Magic Chef's continuous search for the ultimate in gas range design and convenience:

GRAND PRIZE—$5,000

Product Design Associates, New York, N. Y. Front row, left to right: Miss Taina Waisman, Miss Marie DiBari (independent designer), Miss Read Weber. Back row, left to right: Mr. Sidney L. Katz, Mr. Victor Elmaleh, Mr. Jos. Blumenkranz. Product Design Associates also won 3rd prize $2000, and 6th prize $1000.

FIFTH PRIZE—$1000

Lt. Commander W. R. Holt, U. S. N. R.

Ten additional prizes of $500 each awarded to:

Mr. Alfred C. Hoven, E. Grand Rapids, Michigan; The Architects Collaborative, Cambridge, Massachusetts; Mr. Wm. E. Lunt, Jr., Philadelphia, Pennsylvania; Mr. Stewart M. Herman, Seattle, Washington (2 awards); Mr. Walker Johnson, Buffalo, New York; Mr. A. L. Malott, Cleveland, Ohio; Miss Helen G. Dunn, Milwaukee, Wisconsin; Mr. Robert Dean Pfister, Rocky River, Ohio; Mr. Gordon M. Nunes, Los Angeles, California

Lexington, N.Y.C.

SECOND PRIZE—$3000

Mr. Roger G. Spross, New York, New York

FOURTH PRIZE—$1000

Mr. Bert L. Bassuk, Brooklyn, New York
Mr. Martin Glaberson, New York, N. Y.

The American Stove Company wishes to thank the many contestants who submitted entries for this design competition. Only the outstanding competence of the judges made it possible to select the winners from the hundreds of splendid entries we received.

Magic Chef

RED WHEEL GAS RANGES AND HEAVY DUTY GAS COOKING EQUIPMENT

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THE GAS RANGE WITH THE FAMOUS RED WHEEL

CURRENT READING

Oil and Gas Appraisals—J. M. Wanenmacher. "Oil Weekly," March 18, 1946, pp. 46, etc. In the oil and gas industry appraisal usually involves determination of the value of producing oil and gas properties. The appraiser is frequently called upon to evaluate the entire assets of operators or corporations. These may include undeveloped leases, royalty interests, drilling equipment, gasoline plants, automotive equipment, refineries, pipe lines, sales outlets, etc.

Magnesium Gives High Cathodic Protection to Pipe Lines and Buried Structures—L. M. Oldt. "National Petroleum News," March 6, 1946, pp. R-186, 187. Magnesium—yesterday's wartime industrial metal—today is finding new uses in the petroleum industry. Underground pipe lines and metal structures are being guarded against corrosion by expendable anodes buried in the nearby soil and employing the principle of cathodic protection. Greatly increased equipment life is predicted. For example, a flume built of steel piling driven 14 ft. into the earth was expected to withstand corrosion for only five years. Magnesium anodes installed for cathodic protection have extended that life expectancy for an indefinitely long period. Certain magnesium alloys, as described in this article, have been found to offer superior properties as galvanic anodes for this type of protection. When properly installed, as much as 500 ampere hours of electricity have been realized per pound of magnesium consumed at the anode, compared, for example, with 373 ampere hours for a zinc anode. Longer life and efficiency of the magnesium anodes have been achieved by developing new types of backfill—the electrolyte used around the anode.

Bimetallic Double-Wall Tubing for Combating Corrosion—"Product Engineering," Feb., 1946, pp. 102, 103. Metals can be combined to form a two-wall tube to withstand simultaneously two different types of corrosive attack. Typical applications are described, with a summary of the behavior and characteristics of a few common metals and alloys that are used for tubing. Designs are discussed for assembling two-wall tubing in heat exchangers.

The Viscosity of Air, Water, Natural Gas, Crude Oil and Its Associated Gases at Oil Field Temperatures and Pressures—C. Beal. "California Oil World," 2nd March issue, 1946, pp. 3, etc. This paper presents useful charts for conversion of various viscometer units into centipoise and graphically summarizes published investigations of the viscosity of air, water and natural gas at high temperatures and pressures.

Liquefied Petroleum Gas Industry and Its Peacetime Problems — F. B. Fisher and J. W. Vaiden. "Petroleum Engineer," Jan., 1946, pp. 116, 117. An analysis of the present position of LPG industry and a forecast of trends for the coming year.

Safety—And the Future of LP-Gas—S. B. Crooks. "LP-Gas," Jan., 1946, pp. 16, 17. Some safety hints for the LP-Gas dealer are listed in this article.

Application of Laboratory Data on Phase Behavior to Condensate-Reserves Evaluation—E. W. McAllister. "Oil and Gas Journal," Feb. 9, 1946, pp. 92, etc.

Characteristics of Differential Flow Meters and Factors Affecting Their Operation—L. K. Spink. Publication No. 24, issued by Southern California Meter Association through courtesy of the Foxboro Co., and reprinted from October, November, and December issues of "Petroleum Refiner." In this study of flow meter engineering, stress is laid upon the characteristic consistency of operation of differential-type equipment. Its adaptability to control and to dirty or corrosive fluids makes it ideal for metering continuous flow. Differential flow meters are designed primarily to give consistent, rather than absolutely accurate, readings. The author discusses and tabulates constant and variable errors characteristic of different types of installations, and explains operation and installation. Effects of pressure variations, supercompressibility, and viscosity are charted.

Natural Gas Super-Expansibility Meter Factors—G. R. Adams. "Oil Weekly," March 18, 1946, pp. 42, 44, 45. Natural gas at the unusual operating pressures found in the oil fields is compressed more than the ideal gas laws would indicate. Wherever gas is metered, subsurface pressures are calculated, or reservoir gas reserves are estimated, then these deviations should be recognized and eliminated. The family of curves shown is a practical engineering solution to this important problem in a single field (or producing horizon) where the average composition gas gravity and gas molecular composition remain fairly constant.

Safety in Gas Pipe Line Maintenance—A. W. Breeland. "Petroleum Engineer," March, 1946, pp. 190, 192, 194. In gas pipe line maintenance the most serious hazards are fires and blowouts and the major effort obviously should be directed toward the elimination insofar as possible of all conditions that might cause a fire and explosion, and at the same time preparations should be made to fight the fire successfully and to rescue and-or protect workmen in event the gas becomes ignited. This article is limited, in large degree, to a discussion of these two hazards.

Modern Kitchens for Homemaking Instruction—This is another new booklet available from the A.G.A. Home Service Committee. It describes the arrangement and equipment convenient for teaching of homemaking, featuring gas equipment. A section is devoted to color notes and decorations for New Freedom gas kitchens. There are 24 pages with numerous illustrations, and the booklet sells for 15 cents.

Unusual Problems Solved in Repairing Pipe Line River Crossing—W. J. Wilkins. "Oil and Gas Journal," March 23, 1946, pp. 76-79. This article describes how repairs were made on a 10-in. acetylene-welded crossing built 15 years ago. Some ingenious methods were devised, which greatly facilitated the work, and reduced the expense.

Selection and Application of Refinery Instruments — A. Krieg. "Petroleum Engineer," Jan., 1946, pp. 120, etc. Article 1—Pressure Instruments. Proper selection and application of the instruments most commonly used in the refining of petroleum.

HELP WANTED—*Male*

A progressive expanding gas company located in the Puget Sound Country of the Northwest, has openings in the Engineering Department for men with the following qualifications. All must be graduate Engineers under 45 years af age.

Distribution Engineer: With five years actual experience in Gas Distribution and Transmission Design. To assist Chief Engineer in development and expansion of transmission lines, feeders and distribution grid. Conduct Pressure Survey and work out Distribution Maintenance Schedules.

Distribution Main Draftsman: To keep up distribution main maps, extensions and retirements. Keep monthly and annual main records. Set up new detailed main plats using data from field books and work with Distribution Engineer.

Mechanical or Civil Engineer (recent graduate): To start as Draftsman to work on both production and distribution engineering problems. Man of cadet caliber to learn engineering department functions. Work to include field contact.

Write giving full details as to age, education, experience and availability.

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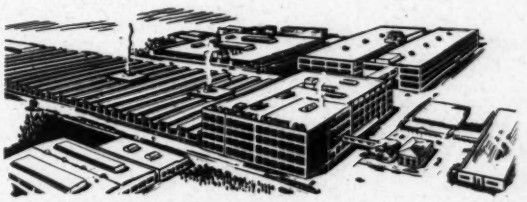

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NOT ENOUGH GADGETS, NOT EXPENSIVE ENOUGH FOR ONE

COOKING PERFORMANCE TO PLEASE EVERYONE

NO HARDWICK RANGE IS PUT INTO PRODUCTION UNTIL EXHAUSTIVE LABORATORY TESTS HAVE PROVEN CONCLUSIVELY THAT IT IS TOPS IN COOKING PERFORMANCE

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Gas
RANGES

HARDWICK STOVE COMPANY

CLEVELAND, TENNESSEE

THE QUALITY LINE SINCE '79

PEOPLE

• **Charles H. Ramsey,** who has been associated with the Pottsville Gas Co. as manager in charge of the sales department, has been promoted to manager of the Hamburg Gas Co., Easton, Pa.

• **E. W. Bowness** has been appointed chairman of the board of the Canadian Western Natural Gas, Light, Heat and Power Co., Ltd. The company controls the Calgary Gas Co., Calgary; Northwestern Utilities Ltd., Edmonton; and the Canadian Utilities Ltd., which has power plants in Alberta and Saskatchewan. Bowness was formerly vice president and managing director of all three companies, and he will continue to take an active part in each.

P. D. Mellon has been appointed vice president of Canadian Western Natural and **Dennis K. Yorath** is secretary of all three companies. **W. L. McPhee** is the treasurer, and **S. C. Murison** is assistant secretary.

Gas companies are gaining good-will for GAS without cost or bother to themselves. This is because GCA contracts are made direct with the users. At the same time their consumers are getting better gas service cheaper. Because the amounts **saved** in lower gas bills and maintenance costs (not to mention the improved results when using top-conditioned appliances) **far outweigh** the nominal service charge.

WHAT GCA DOES

GCA ensures that all its clients' appliances operate at their very highest level. At the first service call, all gas burners are thoroughly cleaned by specially trained mechanics and adjusted to maximum combustion efficiency. Calibration of all thermostat controls is checked. To insure the maintenance of conditions established at the start, inspection calls are made at regular intervals; emergency calls made at no additional charge, at any time on request. Our 68 years of service guarantee that no burner is over or undergassed.

WHAT YOU CAN DO

By recommending GAS CONSUMERS SERVICE to **your** large-scale industrial and commercial customers, you can join with other forward-looking gas company executives in building customer satisfaction with GAS.

• **John J. Bourke** has been appointed promotional assistant for commercial gas under the promotional director of the American Gas Association, according to an announcement by **H. Carl Wolf,** managing director.

J. J. Bourke

Bourke will work with consumers and consumer groups in the hotel, restaurant and institutional field in an effort to protect and increase present gas loads and develop new ones. He will work with organization leaders in the commercial cooking industry and with manufacturers of commercial gas-fired cooking appliances.

Bourke has had experience in restaurant management for hotels, and while in the army during the war was in charge of messing facilities on a large scale.

• As a part of an expansion of its research program, Taylor Instrument Co.'s has announced the appointment of **N. B. Nichols** as director of the research division, succeeding **Dr. H. L. Mason,** who resigned. **Dr. Carlton W. Miller** and **Dr. William A. Mersman,** physicists from Radiation Laboratory, Cambridge, Mass., joined the division early in May. **Walter G. Countryman** has returned to the research division after four years of military service.

• **Paul J. France** has been appointed district sales representative, Roberts & Mander Corp., Hatboro, Pa., according to an announcement by **R. S. Agee,** vice president. France will operate in western Pennsylvania and adjoining sections of West Virginia and Ohio. He will direct the promotion and sale of appliances and train utility company and appliance dealer salesmen.

• **John J. Bergen,** chairman of the board, Gar Wood Industries, Inc., has announced that **Charles W. Perelle** has succeeded **Glen A. Bassett,** retired, as president of the company. Perelle was formerly vice president in charge of manufacturing of Consolidated-Vultee Aircraft Corp. and later vice president of Hughes Tool Co.

C. W. Perelle

Perelle broke into the aviation industry as a painter's helper in 1930. He became a tool designer and in 1937 was sent to Canada to set up, equip and supervise Boeing's Vancouver plant. In 1940 he joined the Consolidated, and under his direction during the war, Convair turned out more pounds of aircraft than any other manufacturer and held the highest position in army air force production ratings.

Later, as general manager of Hughes Aircraft Corp., Perelle was in charge of construction of a giant 750-passenger flying boat soon to be flown.

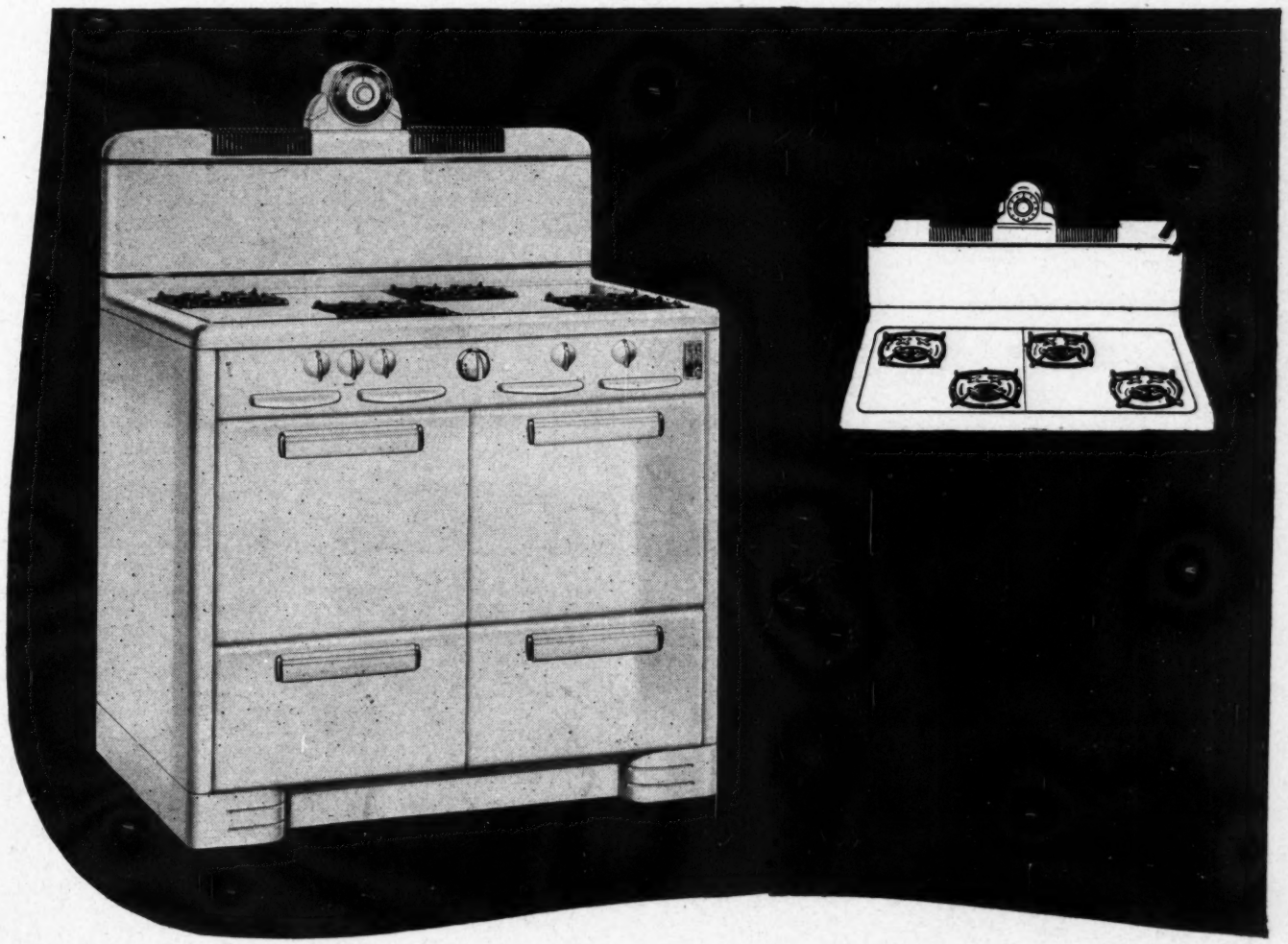
Jewels of Cooking Performance

BY ROPER

"AMERICA'S FINEST GAS RANGE"

- "STAGGERED" COOKING TOP
- "SIMMER-SPEED" BURNERS
- LARGE "3-in-1" OVEN
- "GLO" BROILER
- "SCIENTIFIC" COOKING CHARTS

The new ROPER Gas Ranges of today are superlative cooking appliances, bringing to you features that are truly "Jewels of Cooking Performance"... One of these that stands out even in this stellar company is Roper's patented "Staggered" Cooking Top . . . Advantages? Many! A full 40-inch cooking surface. Plenty of room for 4 large utensils. Elimination of reach-over and reach-around.



TOMORROW'S SMALL CITY GAS SUPPLY AVAILABLE TODAY

Why continue with high-priced, small city gas distribution systems when you can give your customers more dependable service and enjoy a more profitable operation? With comparatively low plant conversion costs today, you can switch tomorrow to modern, economical Liquefied Petroleum Gas.

The demand for low-cost Liquefied Petroleum Gas plants is greatly increased because they operate automatically and provide an adequate supply of uniform high quality regardless of load. Operating and maintenance costs are substantially lower through the reduction of labor, cost of replacements and repairs.

Warren's Liquefied Petroleum Gas is increasingly available from our greatly expanded plant, storage and shipping facilities. Warren's trained organization offers without obligation the full benefit of its broad experience, engineering advice and consulting service. Contact your nearest Warren office today.

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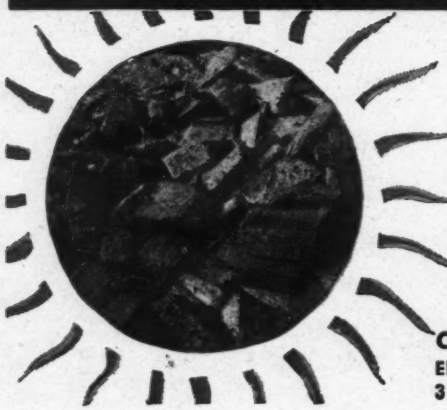
CONNELLY IRON SPONGE



High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs.

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . there is no obligation on your part.

CONNELLY IRON SPONGE & GOVERNOR CO.
Elizabeth, N. J. Los Angeles, Calif.
3154 S. California Ave., Chicago 8, Illinois

H. L. Hall

• **Herbert L. Hall** of Somerset, Mass., has been appointed appliance sales manager of the Hartford Gas Co., Hartford, Conn. Hall is now on terminal leave from the army air forces.

Prior to the war, he was merchandise sales manager for the Fall River (Mass.) Gas Co. In 1940 Hall was awarded a trip to Miami and Nassau for an outstanding sales record on gas refrigerators in the Fall River area.

• **J. F. Ray**, director of sales, General Controls Co., Glendale, Calif., has announced the addition of **F. E. Weldon** and **A. C. Kelterborn** to the New York factory branch sales staff. Weldon has been associated with the Westinghouse Co. in New York and Arens Controls in Chicago, and Kelterborn has been with the Hunter Fan and Ventilation Co. and Burns and Roe, consulting engineers, New York.

• **C. L. Leighton,** division manager of the Southwestern Gas and Electric Co., DeQueen, Ark., was elected president of the Arkansas Utilities Association at the annual convention held recently. Leighton succeeds **L. L. Baxter** of Fayetteville, president of the Arkansas Western Gas Co.

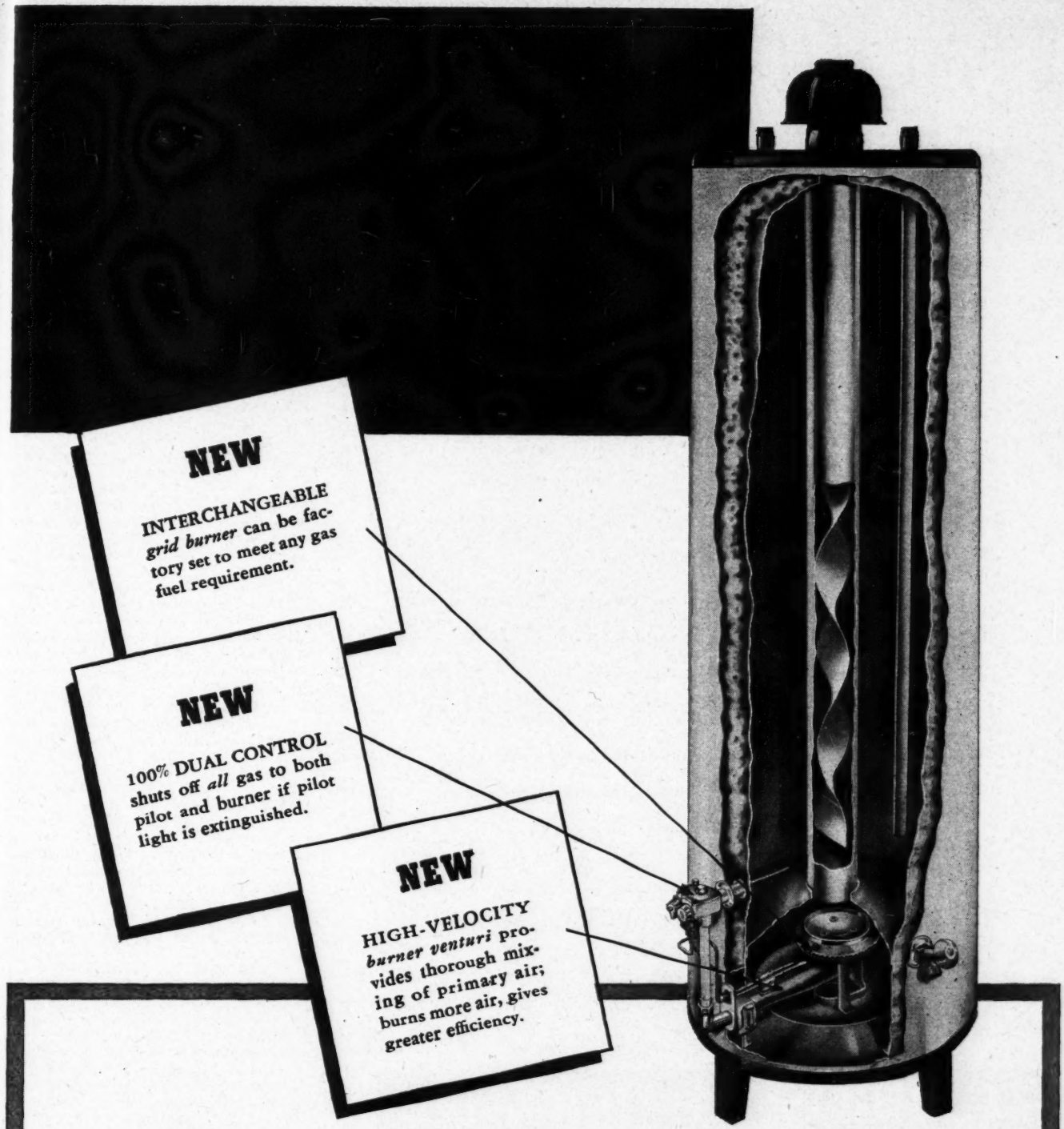
C. H. Thorpe, Little Rock district superintendent of the Arkansas-Louisiana Gas Co., was elected first vice president and **Morgan Wright,** district manager of the Oklahoma Gas and Electric Co., Fort Smith, Ark., was elected second vice president.

• **Norman E. Thompson** has been appointed production manager for all plants of Rheem Manufacturing Co., it has been announced by **W. E. Curran,** director and vice president in charge of manufacturing. **Kenneth W. Browning** is the new sales promotion manager for the heating equipment division with headquarters in Chicago, and **Andrew E. Curry** is district manager of the eastern heating equipment division. **John R. Halpin** has been named appliance sales representative in upper New York state.

• **James E. Cook,** manager of the house heating division, Westchester Lighting Co., Mount Vernon, N. Y., was elected chairman of the Metropolitan Gas House Heating and Air Conditioning Sales council at the annual meeting held in Somerville, N. J., May 15. Other officers elected by the council included: vice chairman, **Lewis G. Paulding,** Long Island Lighting Co., Mineola, N. Y.; secretary-treasurer, **Henry A. Diekmann,** The Brooklyn Union Gas Co., Brooklyn, N. Y.

• **J. Lynn Pflug**, formerly of Haskell & Sells, certified public accountants, has been appointed vice president and comptroller of the South Atlantic Gas Co., Orlando, Fla., where the accounting and auditing operations are located. Company headquarters will remain at Savannah, Ga., for the present.

• **Earl Genn** and **Frederick D. Logan,** formerly vice president and chief engineer, respectively, of Gas Appliance


NEW
INTERCHANGEABLE *grid burner* can be factory set to meet any gas fuel requirement.
NEW
100% DUAL CONTROL shuts off *all* gas to both pilot and burner if pilot light is extinguished.
NEW
HIGH-VELOCITY *burner venturi* provides thorough mixing of primary air; burns more air, gives greater efficiency.

Find out about this handsome new Series 30 by Rheem, America's greatest builder of water heaters. Additional fast-selling features include Rheem hot-dipped galvanized tank, full 1½-inch insulation, double access doors, and wear-resistant baked enamel finish. AGA approved. Sizes: 20, 30, 40 gallons. Write Rheem today for full details. Address 570 Lexington Ave., New York 22

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RHEEM... *making houses into homes*

6,500 MILES OF GAS MAINS

have been treated with CARBOSEAL Anti-leak

Experience on 6,500 miles of gas mains has shown that treatment with Carboseal Anti-Leak is one of the quickest methods of checking gas leakage. This method saves *labor, gas, money* and *materials;* and the job can be done without tearing up streets or shutting off service.

Leakage reduction of 90 to 100 per cent is usual. Actual tests on joints 11 years after treatment with Carboseal Anti-Leak show that the joints remain tight.

A booklet, "Correcting Leakage in Gas Distribution Systems with Carboseal Anti-Leak," tells more about this treatment—how to apply it, how much it costs, what results can be obtained. Write for a copy.

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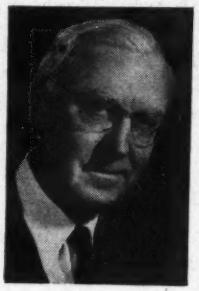
40 RECTOR STREET, NEW YORK, N. Y.

Service, Inc., Chicago, are the principals of Genn & Logan, 3959 N. Lincoln Ave., Chicago 13, an organization which has been formed to represent the C. M. Kemp Manufacturing Co. of Baltimore, Md. The new firm will cover parts of Indiana, Illinois, Michigan and Wisconsin, as well as Iowa, Minnesota, North Dakota and South Dakota.

• **Roger A. Gordon** has been appointed director of sales for the Washington Gas Light Co. and its nearby Maryland and Virginia subsidiary companies, **Everett J. Boothby,** vice prseident and general manager, announced recently. Associated with Gordon in the sales organization he now heads are **A. J. Maloney,** general slaes manager, and **Leon Ourusoff,** manager of utilization.



R. A. Gordon

Gordon assumes responsibility for the general direction and supervision of all residential, commercial, industrial and government sales activities.

• **Ross Miller** has been named manager of the Pacific Coast factory of Gar Wood Industries, Inc., San Francisco, according to an announcement by **Glen A. Bassett,** president. Miller joined Gar Wood in 1920 and recently completed a special assignment as manager of the Philadelphia branch, hoist and body division. The company manufactures automatic heating equipment among other products.

• **J. K. "Jack" Busch** was appointed Midwestern division manager of the George D. Roper Corp., effective April 1. Under his supervision, expansion of the Midwestern division which includes Illinois, Indiana, Southern Michigan, Ohio and Kentucky, will be carried out. Associated with Busch will be **S. M. Barnes, R. R. Chapman, N. McManamy, H. M. Peters, J. M. Phillips** and **W. J. Spencer.**

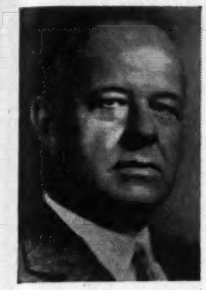
• The appointment of **Robert E. Laffin** to the post of advertising and sales promotion manager of Standard Gas Equipment Corp. of Baltimore and New York, has been announced by **H. C. Erhard,** vice president in charge of sales. Laffin rejoins the organization after his recent release from the army.

• **John C. Reed** of Louisville has been appointed manager of research and product development for American Radiator & Standard Sanitary Corp., Pittsburgh. **Robert E. Daly** of Pittsburgh is the new director of product engineering. Reed has been with the company since 1929 and Daly since 1917.

• **Robert S. Waters,** president, National Radiator Co., Johnstown, Pa., has announced the appointment of **David M. Ramsay** as manager of the industrial division. Ramsay has served in various capacities with the company for five years.

• **Dr. A. E. Gauer** has been appointed president of the B. C. Electric Railway Co., Vancouver, B.C., succeeding **W. G. Murrin,** who resigned at the annual general meeting April 25. Dr. Gauer, 40, is the youngest president in the history of the company.

• **Theodore E. Mueller** of Pittsburgh, Pa., has been elected to the presidency of the American Radiator and Standard Sanitary Corporation succeeding **Henry M. Reed,** who will continue as chairman of the board. Mueller, who was formerly vice president and general manager of manufacturing, will in turn be succeeded by **Henry M. Reed, Jr.,** manager of the company's Louisville works.



T. E. Mueller

Mueller has been with the company since 1904, starting with the Pittsburgh works and later becoming superintendent and eventually manager of the Louisville works. In 1926 he became vice president and general manager of manufacturing of what was then the Standard Sanitary Manufacturing Co., and in 1939 was given the same post in the corporation.

• **A. H. Calderwood,** former manager of Shell Oil's Wilmington refinery, has been appointed manager of the manufacturing department in the company's San Francisco office, according to an announcement by **F. S. Clulow,** vice president. Calderwood replaces **Dr. Monroe E. Spaght,** recently appointed vice president, Shell Development Co., research division.

R. W. McOmie succeeds Calderwood at Wilmington, and **L. R. Goldsmith** takes McOmie's place as superintendent of the Southern California plant.

• The office of chairman of the board of directors of Union Carbide and Carbon Corp. has been abolished with the retirement of **Benjamin O'Shea.** He will continue as a director and a member of the executive committee, however. **Fred H. Haggerson,** president of Union Carbide, and all other officers were re-elected.

• **Justin R. Whiting,** president of the Commonwealth & Southern Corp., has announced that **W. J. Herrman,** formerly vice president of Telephone Bond and Share Co. of Chicago, has joined Commonwealth as rate analyst.

• **W. A. Catlett** of Catlett Engineers recently announced the return to Dallas of **H. G. Clark, Jr.** and **E. P. Haney.** Both men have served overseas for nearly two years and are returning to sales engineering on Surface Combustion, Webster Engineering and Empire Stove Co. lines in North Texas.

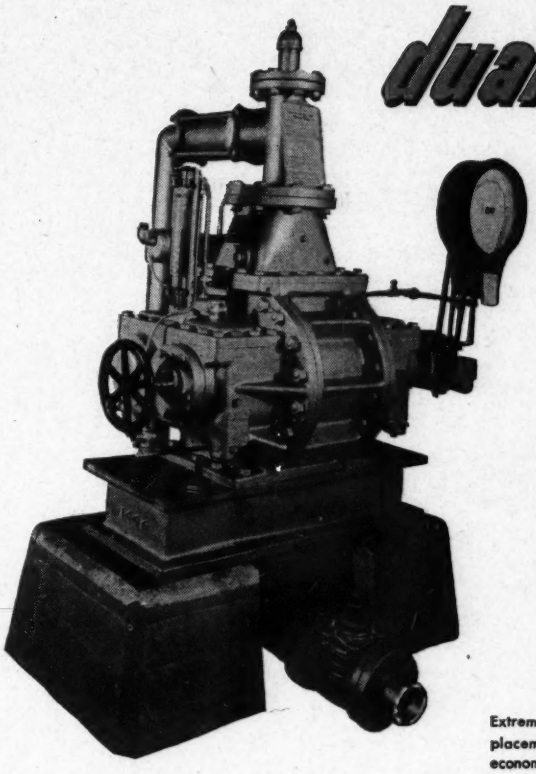
• **P. E. Blackman,** former chairman of the Pacific Coast Gas Association, has been transferred from the gas department of the Pacific Gas and Electric Co. to the office of executive engineer. Beckman's new duties will cover gas contracts and matters affecting rates.

• **R. W. McClenahan** has been elected a vice president of American Meter Co., having returned to the company after his discharge from the army air forces.

• **Kenneth D. Demarest,** formerly with the Griscom-Russell Co., has been appointed district engineer of the Fluor Corp., Ltd., in its New York headquarters. Demarest has been connected with the oil, gas and chemical industries for the past 15 years.

METERING YOU CAN BANK ON...with R-C

dual-ability



R-C Positive Displacement Meters accurately measure from 5% to 150% of their normal ratings.

ROTARY POSITIVE

Extreme simplicity of R-C Rotary Positive Displacement principle enables you to account economically for every cubic foot of gas metered through these units.

• You get accurate measurement of gas or liquid with Roots-Connersville Positive Displacement Meters.

Accuracy is assured by the simple, correct design of the meter, with its absence of small parts, impossibility of tampering and complete freedom from adjustments.

This simplicity naturally leads to low cost per cubic foot of measuring capacity and extremely low maintenance cost over many years. Combined, R-C accuracy and low cost metering give you *dual-ability* not obtainable in any other meters.

Ask for Bulletin 40-B-13, or for engineering assistance to select the correct meter for your specific needs.

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One of the Dresser Industries
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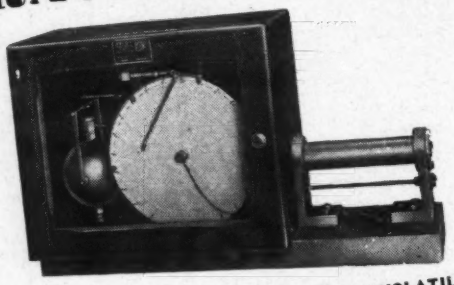
ROTARY POSITIVE GAS METERS

ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

Why Major Company Engineers Select

ARCCO LIQUID GRAVITOMETERS



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1—OPERATES UNDER ACTUAL LINE PRESSURE—High working pressure prevents release of gas —an extremely important feature in measuring specific gravity of highly volatile liquids.

2—AUTOMATIC TEMPERATURE COMPENSATION — Produces highly accurate and fully corrected record of specific gravity of liquid under any designated standard temperature conditions.

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4—NO MOVING JOINTS OR STUFFING BOXES—Friction and leakage eliminated. Instrument is delicately responsive to minute changes in specific gravity.

5—INDICATING AND RECORDING TYPES—Either type available with automatic temperature compensation. Can also be made of non-corrosive materials.

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NEW YORK 5, N. Y.

NATURAL GAS CONSULTANTS

• **Les Hunt** has been selected by Automatic Temperature Control Co., Inc., Philadelphia, as direct factory representative for the home office territory. Hunt has served as chief of inspection and service and as director of research for ATC.

• The appointment of O. **Fred Habegger** as manager of advertising has been announced by **Lyle C. Harvey,** president, Bryant Heater Co., Cleveland. Habegger was connected with the Equitable Gas Co. of Pittsburgh before joining Bryant.

• **James F. Bell** has been appointed assistant to the president of Portland Gas & Coke Co., succeeding **C. H. Gueffroy,** who recently was elected a vice president, according to an announcement by **Paul B. McKee,** president.

Obituaries

• **Paul C. White,** 38, vice president and chief engineer of the Commonwealth Gas Corp., died April 8 at Arlington, Va., hospital. White served with the Federal Power Commission as head of the Natural Gas Resources and Reserves section and had been with the Arkansas Department of Public Utilities, Little Rock, as senior engineer. He was a member of the Gas Resources Research Committee of the American Gas Association.

• **Robert H. Bartlett,** a pioneer in the oil and gas industry in Oklahoma, died in Tulsa May 9. Bartlett entered the industry in 1896 as a meter setter and reader and was later associated with the Manufacturers Gas Co., Union Natural Gas Co., and the Osage and Oklahoma Co. At the time of his death, he was treasurer of the Oklahoma Natural Gas Co.

• **Charles W. Bradley,** 72, former vice president of the Public Service Co. of Northern Illinois, died of a heart attack early last month. Bradley, who is credited with the development and modernization of much of the gas service in the Chicago area, retired in 1940 after nearly 35 years of service.

• **Earl V. Kesinger,** vice president of Natural Gas Pipeline Co. of America, Chicago, died on May 13. He was active for many years on technical committees of the American Gas Association and was instrumental in developing revisions of the American Petroleum Institute specifications for gas line pipe.

Black, Sivalls & Bryson Purchased By Smith Corp.

The firm of Black, Sivalls & Bryson, Inc., has been purchased by the A. J. Smith Corp., a company which was formed to finance the purchase and which will not act as an operating firm. The sale covered both the Kansas City and Oklahoma City manufacturing plants, six wood tank plants, and a network of branch plants, warehouses, sales offices and field service offices in the United States and Canada.

A. J. Smith is president of the corporation and A. H. Black is chairman of the board of directors. The name of Black, Sivalls & Bryson, Inc., will be continued.

PIPE LINE NEWS

• Authorization has been granted by the Federal Power Commission to **New York State Natural Gas Corp.**, Pittsburgh, Pa., to construct facilities needed and to sell 304 MMcf of natural gas yearly to **Dempseytown Gas Co.**, Port Allegany, Pa., and to Dempseytown to construct and operate facilities to transport and sell such gas, according to FPC announcement. The permanent certificates of public convenience and necessity were issued late in April.

In effect, the order will give permance to a temporary permit previously issued, which approved installation Jan. 9, 1946, of about nine miles of 4-in. pipe line extending from the New York State Natural connection point in Clarion county to a connection with Dempseytown's 5-in. pipe line, also in Clarion county, Pa.

• William D. Weidlein, St. Paul, Minn., president of **Mid-Continent Natural Gas Transmission Co.**, recently announced that he will file a petition with FPC amending his present application for a natural gas pipe line from the Hugoton field to Kansas City, extending the proposed line to points in Missouri, Iowa and Minnesota.

Weidlein stated that if the application is granted, his company will construct two 26-in. lines from the Hugoton field to Kansas City, continuing from there with a 26-in. line to connect with several northern cities and towns and with several iron mines.

• **The Arkansas-Oklahoma Gas Co.**, Fort Smith, Ark., has notified the **Arkansas Public Service Commission** that installation of a 6-in. pipe line to serve the state tuberculosis sanatorium at Booneville, Ark., has been completed and that the company is ready to deliver gas to the institution. Installation of the distribution system has been delayed by inability to obtain materials, the report said.

• **Lone Star Gas Co.** recently completed a 75-mile line from Opelika to Carthage, Texas, tying into the company's 5000-mile network at Opelika. The 14-in. line is capable of 1200 lb. pressure and has a maximum capacity of 100 MMcf daily. The line was constructed by the Oklahoma Contracting Co., under the general supervision of Julian L. Foster, Lone Star general superintendent.

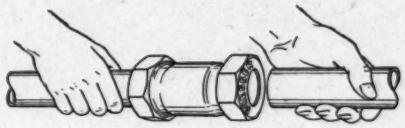
National Radiator Acquires Pullman-Standard Plant

Purchase of the Pullman-Standard Car Co. plant at Middletown, Pa., where steel boilers for industrial and domestic use, pressure vessels, heat exchangers and other industrial products will be fabricated, has been announced by the National Radiator Co. of Johnstown, Pa. Production of these items was formerly done at the Lebanon plant.

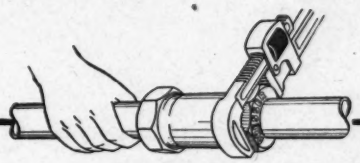
The move will permit the company to expand production of equipment used in heating, chemical, petroleum, and processing industries. The Middletown property contains over 300,000 sq. ft. of floor space. Once in full production, this single plant will employ 1500 persons.

This half-minute joint

gives



permanent protection



Stab plain pipe ends into a Style 90 SUPER-SERVICE Fitting . . . tighten the end nuts with a wrench . . . and you have a permanently tight, *flexible* joint.

You get protection against pipe-joint leakage because Dresser Style 90 Fittings have *extra packing power*, stay gastight.

You get protection against vibration and line movement because they permit deflections up to 6° without loss of tightness.

Available in ells and tees as well as straight couplings. Write for literature. Dresser Manufacturing Division, 136 Fisher Ave., Bradford, Pa. Houston Office and Warehouse: 1121 Rothwell St., Sec. 16, Houston, Texas. In Canada: Dresser Manufacturing Co., Ltd., 60 Front St., West, Toronto, Ont.

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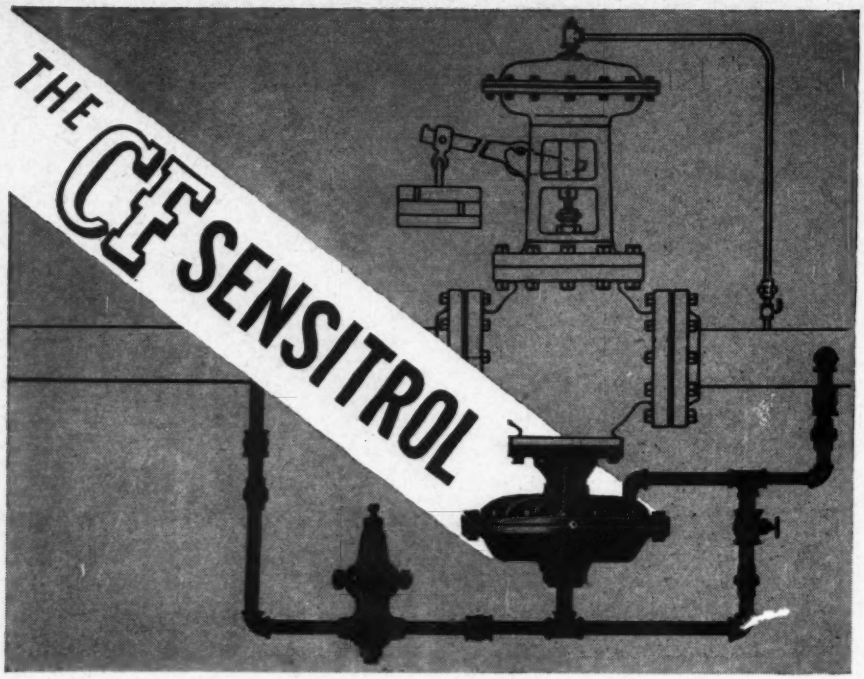


Gives

PILOT-LOADING CONTROL

for High and Low Pressures

An auxiliary pilot-loading mechanism for use with a weight-loaded gas regulator in controlling high, medium, or low outlet pressures. Easy installation, more accurate regulation, increased usable capacity, uninterrupted service, operation on lower line pressures to reduce leakage, bleed into the outlet — not the atmosphere — at all times. Can be attached to a regulator already in use, with no other change. For new installations, furnished with a regulator of correct type and size.

SENSITROL is of rugged construction, trouble-free in service. Write for Bulletin 150.

THE CHAPLIN-FULTON MFG. CO.

38 PENN AVE. PITTSBURGH, PA.

Lone Star Plans $8 Million Expansion Outlay in 1946

The addition of 18,500 new meters during 1945—enough to serve two cities—has necessitated the allocation of $8.3 million by the Lone Star Gas Co., of Dallas, Texas, for its expansion program during 1946. The outlay will be used for construction and new equipment intended to improve its service to the 300 towns and cities in its system, according to an announcement by President D. A. Hulcy.

With expenditures dependent upon availability of materials and manpower, the following schedule has been set up:

Street mains, service lines, meters, regulators, replacements, $2 million.

Pipe line construction from gas fields to the cities to tap additional gas reserves, $2.2 million.

Expansion of butane facilities for gas service beyond the gas mains, $433,000. This program is intended to afford city gas service to more farm families.

Drilling wells, $1.3 million.

Dehydration, cycling, and gasoline plants to treat the gas and promote conservation, $1.4 million.

Replacement of existing facilities, $865,000.

Purchase of leases, $210,000.

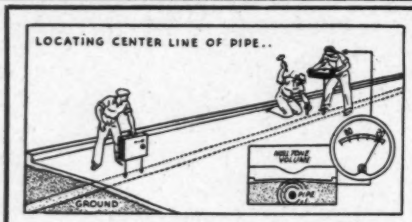
During the past five years, Lone Star has added 78,175 new customers.

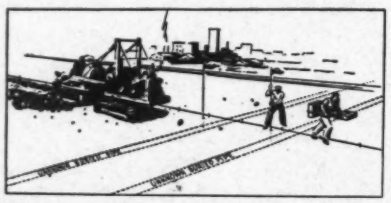
CRC Orders Increase On Basic Gas Discount

The California Railroad Commission ordered Southern Counties Gas Co. to increase the basic discount on gas rates from 7½% to 9½% effective May 15. Purpose of the plan is to adjust rates to earnings during reconversion. The CRC requires that a check be made every quarter to determine net revenues for the preceding 12 months. If investigation shows that these revenues differ by more than $50,000 above or below the "criterion revenue" set at $2.35 million, customer rates will be adjusted accordingly. The plan will remain in effect through March, 1947.

Rockwell Buys Out Ross Packaging Machinery Firm

The Rockwell Manufacturing Co., maker of meters, valves, regulators, and machine tools, has added to its holdings the A. H. Ross Co. of Ludlow, Ky., manufacturers of packaging machinery. Col. Willard F. Rockwell, president and chairman, has announced.





M-SCOPE

Buried Pipe and Cable Finder

16 PAGE BOOKLET FREE UPON REQUEST

FISHER RESEARCH LABORATORY

Palo Alto, California

Gas Rate Slash Approved

The Oklahoma Corporation Commission April 26 approved an order for reduction of the gas rates of the Arkansas-Oklahoma Gas Co., which will mean $5250 less in receipts from customers. The cities of Sallisaw, Muldrow, Moffitt, and Roland, and rural subscribers are affected.

Kentucky Firm Expands

The Union Light, Heat & Power Co., Covington, Ky., has announced plans for construction of a new service building in Covington, at an estimated cost of $399,000. E. R. Mitchell, general manager, said the new building will supplant present electric and gas installations.

Mississippi River Fuel Plans Pipe Line Extension

An application to construct additions to its natural gas transmission system which would increase the natural gas sales capacity of the system by approximately 50 MMcf per day has been filed by the Mississippi River Fuel Corp., St. Louis, Mo., with the Federal Power Commission. If approved, the project would cost approximately $11.6 million.

Construction is tentatively scheduled for September, with completion by the first of 1947 in order to meet peak requirements in January and February. A series of partial loops will be constructed in each section of its main line from Perryville, La., to the vicinity of St. Louis. Perryville is the starting point of the company's distribution system, which extends through Arkansas and Missouri into Illinois.

A total of about 265 miles of 22-in. pipe will be laid if plans are approved.

Mississippi River Fuel also proposes to increase the capacity of its compressor stations.

The company, which purchases natural gas in Monroe, La., plans to add to its list of customers the Missouri Natural Gas Co., which in turn proposes to distribute the gas in St. Genevieve, St. Marys, and Perryville, Mo. Mississippi River Fuel would also connect three additional main line customers in Missouri: the Mississippi Lime Co., St. Genevieve Lime Co., and Peerless White Lime Co.

To protect its natural gas supply, Mississippi River Fuel has signed a new contract with United Gas Pipe Line Co., which will supply gas from the Carthage Field in Texas sufficient to satisfy the company's full requirements, if necessary, for a period of 20 years. Under its current contracts, it will continue to receive gas from the Monroe field until 1951.

Operations Under Way At United's Absorption Plant

The final link in United Gas Pipe Line Co.'s East Texas development project was scheduled to go into operation last month, according to a company announcement. This latest addition is the absorption gasoline plant at Carthage which is designed to process 150 MMcf daily (100 MMcf completely processed and 50 MMcf partially). Daily recovery of the plant has been estimated at 150,000 gal. of such products as motor fuel, gasoline, kerosene, liquefied petroleum gases, butanes, propanes, etc., revenue from which would otherwise be lost.

The plant, designed to operate at a pressure of 1200 psi, will be connected with 81 wells in the Carthage field by a gathering system of more than 100 miles of lines.

Milwaukee Engineering Has Special Gas Service Course

A special course in gas service and engineering has been added to the program of the Milwaukee School of Engineering, through cooperation with the Milwaukee Gas Light Co. Henry Dropp, Milwaukee Gas Light sales manager, worked with the school in developing the course which includes instructive talks by various manufacturers in the industry. Enrollment in the school numbers 700, most of whom are veterans.

Customers like its
NEAT APPEARANCE!

AND good looks are only one of the many advantages of Transite Flue Pipe!

Light in weight, Transite Flue Pipe can be cut to size on the job, goes up readily, requires little support. It is rustproof, needs no paint.

Transite Flue Pipe is furnished in round and oval shapes, in sizes for all normal requirements. A complete line of fittings, couplings and other accessories is available.

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For full details, write for booklet TR-13A. Address: Johns-Manville, 22 East 40th Street, New York 16, New York.

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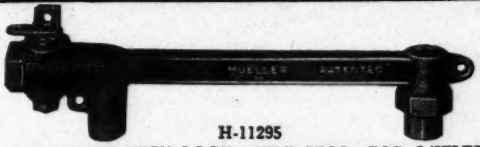
For venting gas-burning appliances

PROTECTS METERS FROM STRAIN

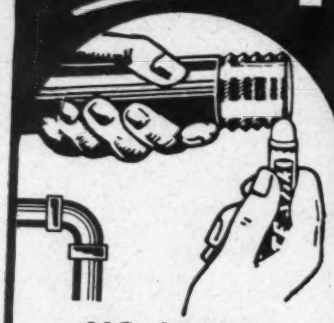


H-11295
END INLET WITH LOCK WING STOP—TOP OUTLET

By means of the PATENTED Bevel Connector the supply pipes are forced into axial alignment. Meter tubes are protected from strain, and threads are braced and shielded from rust. There are only two threaded joints—no gaskets—no union joints. . . MUELLER Meter Bars save you time and money, speed installations, and by preventing sagging pipes and tilting, assure accurate registration of your meters. . . Stock up NOW while we have them.

MUELLER CO. DEPT. G-17. DECATUR, ILL. • LOS ANGELES, CALIF.

NOW-PIPE JOINT COMPOUND in Stick Form



NO LEAKS!

Just rub 3 or 4 strokes across pipe threads. It spreads and fills threads when turned.

FOR ALL THOSE PIPE INSTALLATION AND REPAIR JOBS

Always Ready For Instant Use

ECONOMICAL—HANDY—CLEAN

Ideal for the Gas Industry

Tested and Fully Approved by Independent Laboratories and Industry.

WON'T DRY OUT

NO MESS
NO BRUSH
NO WASTE

Note these **FEATURES**

- You use only the exact amount of compound needed to form perfect seal—no waste.
- Cuts material and labor costs.
- Withstands vibration, temperature changes, deflection and pressure.
- Joints can be remade without having to clean threads.

Write for Free Sample and Prices

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INSTALL UNDERGROUND LINES

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with an *Earthworm*

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Features of the EARTHWORM

- **Small — easily portable — minimum manpower requirement.**
- **Easily operated — straight line accuracy in boring to given point.**
- **Saves repaving of streets— minimum street openings.**
- **Pays for itself — average boring speed, 1½ ft. per minute.**
- **Manual feed warns of underground hazards — pipe and gas lines.**

Two Models — No. 15 for light work; No. 25 for heavy.

For Information Write Box 1100

Earthworm

BORING MACHINE • MANUFACTURED BY LUBE JACK CO., SANTA MONICA, CALIF.

Doubling of Liquefied Gas Sales by 1951 Predicted

A 100% increase in the sales of liquefied petroleum gas within the next five years was predicted by J. H. Dunn, re-elected president of the Natural Gasoline Association of America, in an address given at the association's 25th annual convention, held in April in Fort Worth, Texas.

Stressing the problems, rather than the benefits, of such a market, Dunn pointed out that while the manufacturer is taking advantage of the projected increase in his butane and propane outlets, he will still be faced with trying to make a profitable disposition of the remainder of the product—butane-free gasoline. In the interests of conservation, he said, full utilization of the lighter hydrocarbons produced with crude oil and natural gas must be sought. A satisfactory return from the marketing of these products, if economically transported, was predicted.

Two Buildings Bought by Milwaukee Gas Specialty

To meet the needs for increased office space and better laboratory facilities for its research and development department, the Milwaukee Gas Specialty Co. has purchased two adjoining buildings on North Jackson street, Milwaukee, Wis. A four-story structure will house the administrative, purchasing, and engineering offices, with reseach and development moving into a two-story building, according to O. J. Leins, vice president and general manager.

Researchers plan to accelerate their experiments on gas control methods, ignition sytems, and protective devices.

Brooklyn Employees Net $11,000 From Suggestions

Ideas for improving working conditions, cutting costs, and speeding up production have yielded cash bonuses totalling nearly $11,000 to 1738 employees of Brooklyn Union Gas Co., Brooklyn, N.Y., during the past 14 years, the company has disclosed. Since the inception of the suggestion box plan in 1932, 8701 ideas have been submitted.

The accounting and auditing departments have been the most prolific, the report shows. Employees of these departments submitted a total of 1383 plans during the period reported on, representing 17% of the total.

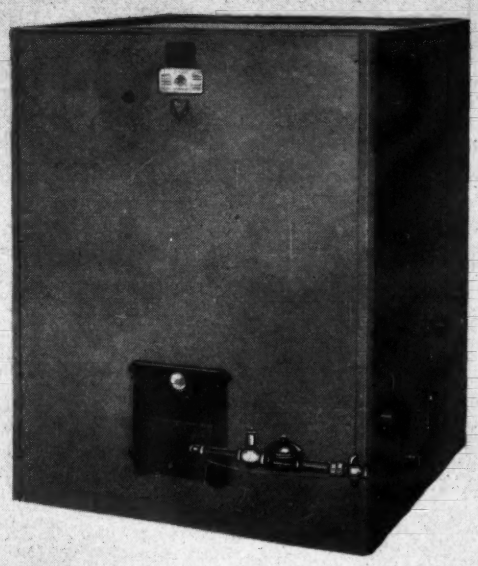
Coroaire Appoints Firm As Texas Distributor

A. W. Conley, vice president and general manager, Coroaire Heater Corp., Cleveland, Ohio, has announced the appointment of the Electrical and Mechanical Supply Co., 708-716 North Piedraf street, El Paso, Texas, as distributor in Texas for the Coroaire console model 85-G gas-fired winter air conditioner.

Carbon Plant Proposed

The Texas Railroad Commission has scheduled a hearing for June 18 on the application of Charles Eneu Johnson and Co. to operate a carbon black plant in the South Ceasar field, Bee county, Texas. Flared gas is to be used in the plant.

Another Member of the Hammel Line



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An abundance of warmth *when* you want it—*where* you want it, is provided by Hammel's highly economical Gravity Furnace.

Because of their extreme simplicity they are adaptable to a wide range of uses in modern heating. These furnaces are extremely popular for residential and commercial buildings. Hammel Gravity Furnaces are clean and quiet in operation; they add to the appearance of any basement. May be equipped with your choice of standard controls.

Write or phone for complete information on any heating unit in the Hammel line—there's one available for every heating need.

Hammel welcomes your inquiry on any heating problems From selecting the proper heating unit to problems on installation, you can be sure of your answers from Hammel There's no charge or obligation, of course Look to Hammel for the symbol of quality and guaranteed satisfaction.

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GAS CONTROL SINCE 1892

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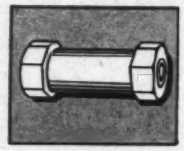
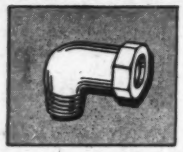
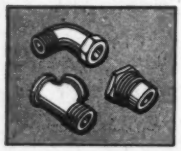
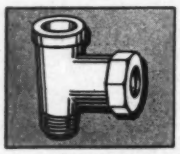
SLEEVES AND FITTINGS

for maximum deflection, ease of "stabbing," complete confinement of the rubber!









So close are "Normac" rubbers confined at the gasket tip that possibility of flow is reduced almost to "nil." These couplings, sleeves and fittings . . . approved by gas utility men across the country for their time-saving features, ease of handling and dependable service . . . are available in a complete range of sizes. Made from air furnace malleable iron they provide greater wall thickness than pipe on which used.

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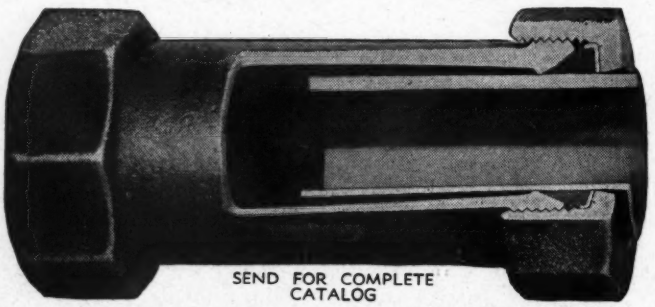

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—An all aluminum regulator with corrosion resistant internal parts. Extremely light in weight; easy to handle and inexpensive to ship. High capacity with close regulation at all pressures the H-M Regulator is known for long life and practically trouble-free operation.

Factory Tested and Sealed at Customer's Desired Setting

Produced complete by THERMAC from foundry to final assembly, each unit is factory tested and sealed. Additional orders now being accepted. Literature and quotations upon request.

1—LOW SHIPPING WEIGHT
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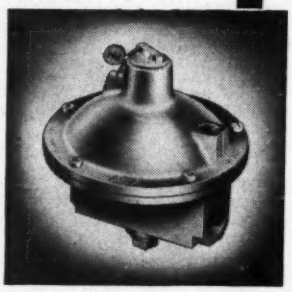

H-M Low Pressure Gas Regulator
Sizes from ⅜ in. to 1½ in.

THERMAC COMPANY
800 EAST 108 ST. • LOS ANGELES 2, CALIF.

Makers of Norgas Move Into New Building

Norman Products Co., Columbus, Ohio, producer and designer of gas-fired heating units, has moved into its new plant and production of its first product, Norgas conversion burners, is under way.

The building, located at 1150 Chesapeake Ave., covers 10,000 sq. ft. on a single floor. With this new location and modern equipment, the company plans to market other allied products shortly.

Incorporated in August, 1945, the company is headed by E. A. Norman, Jr., president, and D. D. Piper, secretary-treasurer and sales manager. Norman was formerly with Surface Combustion Corp., Ensign-Reynolds Co., American Gas Products and New York Consolidated Co., and Piper was district manager for White-Rogers Electric Co.

Norgas burners operate on a principle of spreading gas heat from a single flame retention head.

Winners Announced In Range Design Contest

S. E. Little, vice president, American Stove Co., has announced the winners of the Magic Chef "Gas Range of Tomorrow" contest. He stated that over 500 entries were considered, including every conceivable range design, and that the contest had increased the "gas consciousness" of consumers, architects and designers.

Product Design Associates of New York won first, third and sixth place awards of $5000, $3000 and $1000. Second prize of $3000 was won by Roger G. Spross, New York, while Bert L. Bassuk, Brooklyn, and Martin Glaberson, New York City, shared the $1000 fourth place award. Fifth prize of $1000 also went to a New Yorker—Lt. Comdr. W. R. Holt. Ten $500 awards also were given.

All winning designs are now being studied in an effort to incorporate them in the "gas range of tomorrow."

New Addition for Cleveland Foundry Plant Started

Construction of a $350,000 addition to its plant, which it is predicted will allow the company to increase its production capacity by one-third, has been started by the Cleveland Foundry Co., a division of Cleveland Co-Operative Stove Co., Cleveland, Ohio. A completely modern core oven department will be housed in the new two-story brick and concrete structure, which measures 85 by 245 ft.

Completion is scheduled for Sept. 1. Cleveland Foundry supplies castings to the Grand Home Appliance Co., as well as to other manufacturers in the household appliance, farm equipment, and industrial equipment fields.

Gas Franchise Sought

The Paragould, Ark., city council was scheduled to take action May 20 on an ordinance seeking to grant a franchise to the Arkansas Western Gas Co., Fayetteville, Ark., to serve the city with natural gas. Also before the council were applications of R. E. Branch, Little Rock, Ark., to serve the city with propane gas, and D. G. White of Paragould to serve it with butane gas.